

SPECIAL ISSUE! THE TOP 40 MAC PRODUCTS OF THE YEAR

MARCH 1993

MacUser

PREVIEW!

NEW from **APPLE**



**Keyboard
and
Mouse**



New StyleWriter II



**Color Printer
and Color Scanner**

The 8th Annual
**EDITORS'
CHOICE
AWARDS**



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s of businesses.



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This year,
we upgraded
six products.



MacUser

MARCH 1993

Volume 9 Number 3

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Inset photos by Steven Underwood

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improved
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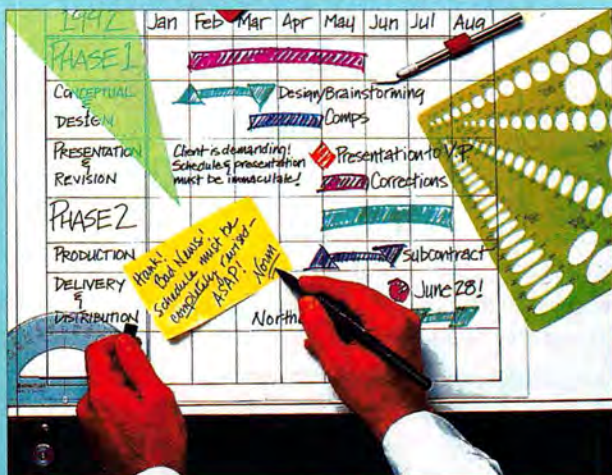
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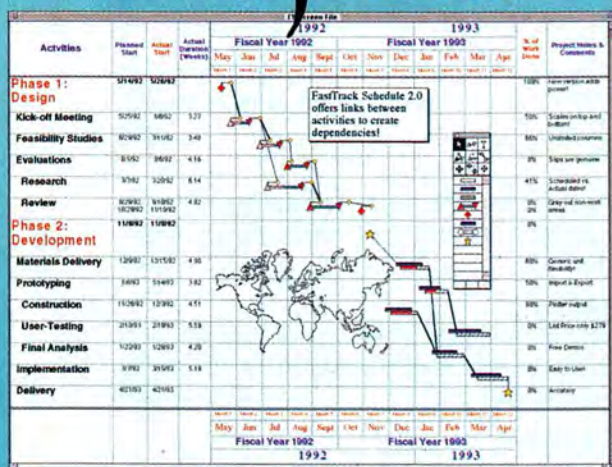
Customizable accessories let you personalize the look and sound of your Macintosh. 211

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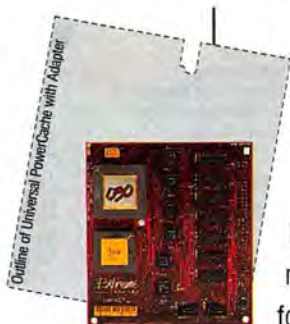
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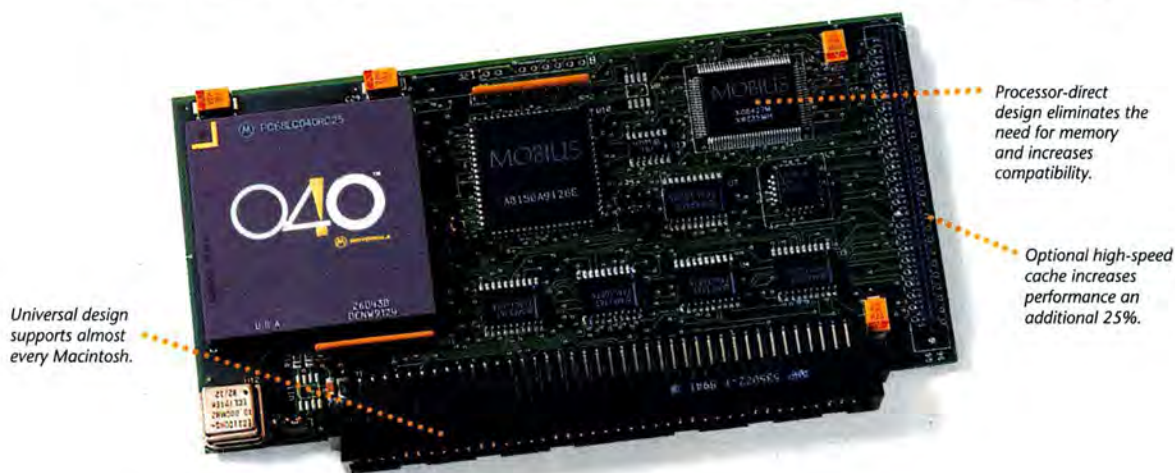
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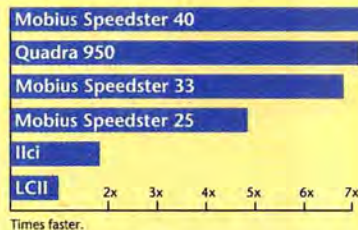
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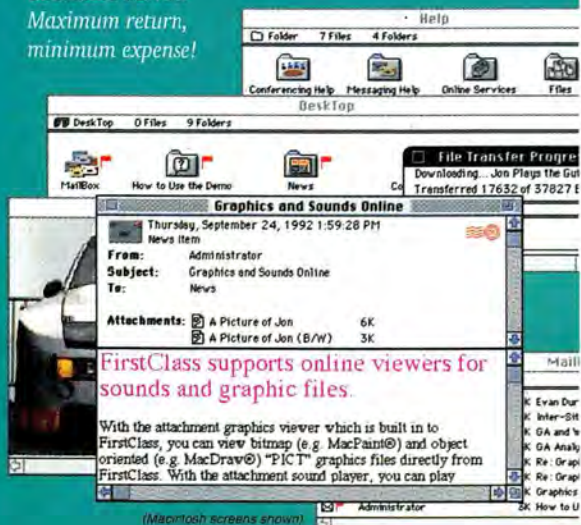
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About

MacUser

Glitz, Glamour, and Glory

The Eddy Award statue looks something like an Oscar, and the annual *MacUser* Editors' Choice Awards ceremony has all the glitz of a Hollywood gala.

And an Eddy Award can mean as much to a software or hardware company as an Oscar can to a movie studio, bringing not only fame but also fortune. The results, in terms of recognition, influence, and the bottom line, can be immediately palpable for the hardware or software company whose product is named as a finalist for a coveted Editors' Choice Award.

But unlike the Oscars, *MacUser*'s Editors' Choice Awards are not decided upon by voters who may be totally unfamiliar with the nominees. There are no full-page ads in the trade papers to lobby those voters. And there is no Academy of Computer Arts and Sciences to pick the recipients. We do it the hard way.

On the other hand, the Academy doesn't have state-of-the-art labs to run candidates through grueling tests. Nor does it have the expertise of *MacUser*'s editorial staff, which, between November 15, 1991, and November 15, 1992, put hundreds of new products through their paces to come up with this year's nominees.

And the Academy doesn't have senior editor Pamela Pfiffner shepherding the awards process. That's Pamela in the picture, along with some of her friends. With a little bit of help from Eddy evangelists Victoria von Biel, James Bradbury, Mark Frost, Jeffrey Milstead, Sean Safreed, and Stephan Somogyi, Pamela presided over the passionate opinion wrangling that occupied our experts more and more as the evaluation process neared the final weeks. The makers of Eddy-nominated products that survive this daunting gauntlet can be assured that the final decisions on nominees and award winners are the result of hours of research, hands-on evaluations, and the *MacUser* QUIVER factor — which means that a product must encompass, in some serious measure, all of the following: quality, usefulness, innovation, value, elegance, and reliability.

The idea is to honor neither the most popular nor the best-known but the very best. We've been doing it for eight years now. It's hard work, and it doesn't get any easier.

Of course, when you're sitting there in your tux or gown and Pamela or one of the other editors reads off your name and hands you that golden statue and the lights are glaring on you and the cameras are rolling and the microphone is thrust in front of you for your thank-you speech and the moment is all glamour and glory — then it *is* Hollywood.

As it should be.

Congratulations to all of this year's Editors' Choice Award finalists!

— Nancy Groth



Senior Editor Pamela Pfiffner had her hands full as she guided 1992's Editors' Choice Awards to their gala finale.

POWER TRIP



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4M

LaserJet

4M 4M 4M 4M 4M

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35 PostScript Type 1 typefaces for Mac and PC PostScript users, and 35 Intellifont and 10 TrueType typefaces for PC users produce a broad range of document styles.

At last, Hewlett-Packard introduces a laser printer built specifically for the Mac from the ground up—the new LaserJet 4M. A laser printer for Mac users with everything you expect. And, more importantly, everything you need. From built-in PostScript Level 2 software from Adobe and 6 MB of memory, to standard LocalTalk and optional EtherTalk. Features which make certain this new generation in laser printing is ready-made just for you.

The finest print quality in its class.

In addition to complete Macintosh compatibility, the LaserJet 4M printer also delivers the finest print quality of any 600 dpi machine available—thanks to



Faster printing of complex documents.

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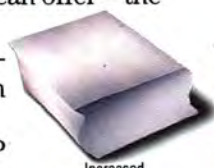
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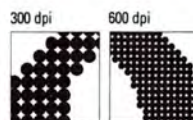
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CIRCLE 62 ON READER SERVICE CARD.

LETTERS



Names for future Macs keep arriving in response to John C. Dvorak's November '92 "The Game of the Name" column (page 362). Douglas Waud, of Shrewsbury, Massachusetts, suggests that the next operating system be dubbed Successor — as in Apple's SOS. Christian Schmitz-Moormann, of Bayreuth, Germany, advocates a return to women's names (remember the Lisa?), preferably one that conveys the acquisition of knowledge. It's the Eve, of course. Robert Wolff in Volcano, Hawaii, noted that with the Performa, Apple followed Detroit's tendency to bestow names that end in a. "Apple might give us the Sublima, but I prefer Risqué (the computer with the RISC inside)." Real cute, Robert, but what about something with a bit more brawn... like

Bubba?

Write to Letters to the Editor, c/o

MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of

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All letters become the property of MacUser, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

Writing on the Wall

Andy Ihnatko's article "Murder by Chapter 11" (December '92, page 29) was very educational and interesting, but Andy might be forecasting the bankruptcy of Apple without knowing it. He says, "When a company is regularly announcing huge price cuts for its products and when it announces that it's cutting staff, that's the time to start getting worried." In the same issue of *MacUser*, on page 49, we read "Apple Slashes Prices Again" and "Apple Closes

Fremont Plant," with approximately 300 employees laid off.

Should I start worrying about a DOS-only world? Yikes!

Vincent Paquin

Deux-Montagnes, Quebec
Canada

Details, Details

Your otherwise excellent review of the Mac IIvx ("The Multimedia Mac: The Macintosh IIvx," December '92, page 126) did not include any mention of whether or not it uses a 32-bit-wide data path. It's important to me — and to other readers, I'm sure — because the models with wider data paths are generally faster (unlike the faux-fast 16-megahertz 68030 LC II.) Please remember to include this info in future articles.

Doug O'Brien,
via ZiffNet/Mac

Good question. Yes, the IIvx uses a 32-bit-wide data path. Now, your next question is, "So why isn't the IIvx faster than a IIci?" As we explained last month in a similar question about the Performa 600, the width of the data path is only one of many performance bottlenecks. — RI

Something much needed in reviews and advertisements for software is information

Dear Mr. Sculley...

December's question, "What topics do you need to hear more about from Apple?" was the equivalent of a "Kick Me" sign. Complaints targeted everything from Apple's customer service to its stinginess with floppy disks.

"It's ridiculous to have to go out and buy 15 disks to back up the System Folder and ClarisWorks before we can even begin using our new Performa 400," fumes Richard Fisher, of Prospect Harbor, Maine. Furthermore, he complains, the ClarisWorks manual costs an additional \$29.95. "How can you be so sleazy! My kids need this computer for their schoolwork, so I can't return it. How can you go so far toward producing a machine that real people can use, only to stick them with these cheap shots?"

What concerns readers most is keeping pace with Apple's parade of technology. "With the Power PC around the corner, what are you and Apple going to do to help the installed base keep up with the newer operating systems and faster hardware?" asks Barbara Passman, of Chicago. "Rephrased: How are you planning to combat obsolescence in your supporters for all of us who love and use Macs and can't simply toss out our Macs every year to 'upgrade'?"

Seconds Jim Huddle, of Alexandria, Virginia: "Please get a grip and stop already with the 'Macintosh, Diet Macintosh, Caffeine-Free Macintosh, Caffeine-Free Diet Macintosh, Macintosh Free' mind-set. It may be a real slick, money-making idea to come out with a new flavor every season, but people who actually use the Mac quickly grow to resent the speed with which their new machines become obsolete."

Mixing his metaphors, Jim continues, "Consider the moderate-sized house with the big backyard. It's not overly expensive, yet it allows you room to expand without having to move to a new neighborhood. We need that ranch house. We need it before you give us the Mac LC IIpx{adios}r79Q next quarter."

Shepard Hoodwin, of New York, can relate. He got burned twice: His dealer didn't tell him about the Mac Plus when he bought his 512K, and his new Classic was immediately superseded by the Classic II. "It really irks me how Apple seems to constantly sell obsolete merchandise, apparently to entice people to buy at lower prices. Then, when these buyers find that their system is too limited, they have to go out and buy what they should have purchased in the beginning." But third time's a charm. When Shepard went shopping for a PowerBook, he realized all he could afford was a 100. He saw the writing on the wall and passed.

Mr. Sculley goes to Washington? No, it's not the name of a movie but a real possibility, if word on the street is correct. If John Sculley takes a Cabinet position with the new administration, there'll be a vacancy at Apple. Will it be Steve's next job? Madonna's last fling? Will they make the Pepsi connection and hire Michael Jackson?

Speak Up:

If John Sculley should leave, who should take the helm of Apple, and why?

Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

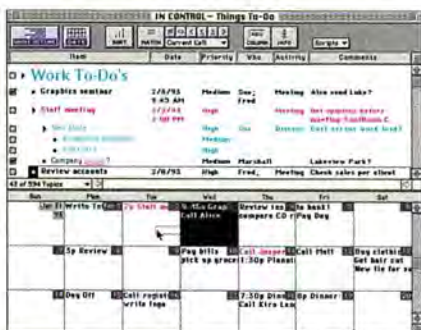
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CIRCLE 209 ON READER SERVICE CARD.

LETTERS

about compatibility with the 68040 microprocessor. In your December issue, Bob LeVitus reviews Retrieve It! and mentions a related product, On Location ("My Favorite Things," page 257). I used to use a similar program called Gofer, which doesn't run on a Quadra; I gave it up for On Location, which does. I wonder about Retrieve It! — Bob doesn't say.

J. G. Johnson
Corvallis, OR

As with most power-user software, Retrieve It! (now distributed by Claris) does in fact run on a 68040 Mac. As a rule, we discuss basic platform requirements in almost every review, but buyers are well advised to find out from software publishers whether particular packages are a fit with their machines. — SJ and BL

System 7 Heaven?

I tend to be a latest-and-greatest person who upgrades software at every opportunity, so I installed System 7.1 as soon as I could ("System 7 Takes on the World," December '92, page 162). After using it for a week and a half, I've returned to 7.0.1 with Tune-Up. After switching to 7.1, I had to manually quit programs that used to quit automatically at shutdown and AlarmsClock (part of Now Utilities 3.02) disappeared every time I performed any of about 85 actions such as clicking in certain places, using the delete key in certain programs, and so on.

Most disappointing was that rather than restore the customizability of the System 6 Finder with which the shareware program Layout used to work so well, Apple went even further and made it impossible to change the time delay for editing filenames.

Laurence Harris
via ZiffNet/Mac

Is 7.1 a good upgrade for "the rest of us"? I've already downloaded QuickTime 1.5, I don't have a new "enabled" Mac, and I don't require a foreign language.

How about compatibility issues? Speed? Disk and memory requirements? Bug fixes and new bugs? C'mon, guys! Where's the beef?

Henry Musikar
Rockville, MD

When we provide sneak previews of new system software, it's often a few months before the product ships.

MacUser's policy is to avoid performance testing of beta products, and we can't research every potential compatibility conflict or bug prior to going to press. Two things we can say about 7.1 are that it incorporates all the bug fixes in previous System 7 Tune-Ups and that Apple has stated that 7.1 will be required to take advantage of new technologies such as QuickDraw GX, OCE, and AppleScript. — HB

I've been using System 7 on my LC II and PowerBook 145 for a while now. The only reason I use this "state of the art" system is that Apple says I can't use System 6 on these models. If I had a choice, I'd use System 6, the system I have on my old Mac Plus. System 7 is slow, a memory hog, and an overall hassle. I can't use a couple of my favorite DAs with System 7. I could buy new, super-duper, better versions of these accessories, but I don't enjoy continually throwing money at the latest-and-greatest versions of everything that comes along. I expect the money I spend toward software to be a long-term investment. (Take note, computer industry: Maybe this has something to do with the high levels of software piracy.)

Being restricted to System 7 makes Apple's new products much less valuable. At least my Plus still gives me the freedom of choice missing from the newer Apple models.

Dale Frank
Manhattan Beach, CA

You have several choices. First, you're restricted to System 7 only with your PowerBook 145. Although Apple ships System 7 with the LC II, that model can run with System 6.0.8 (available from Apple for \$49; call 800-795-1000). Finally, your Mac Plus presents you with a real choice only as long as it has the 4 megabytes of RAM needed to effectively run System 7. — PP

Pay-Per-Use Software

Michael Swaine makes an interesting suggestion amounting to something like a PPU (pay per use) software-marketing scheme ("Applications That Fit," December '92, page 41). The biggest problem with PPU software that's sold online, however, is technical. How would you monitor usage? Suppose I download a program that allows me to use it ten times before it locks me out and I use up my ten access times. Instead of paying

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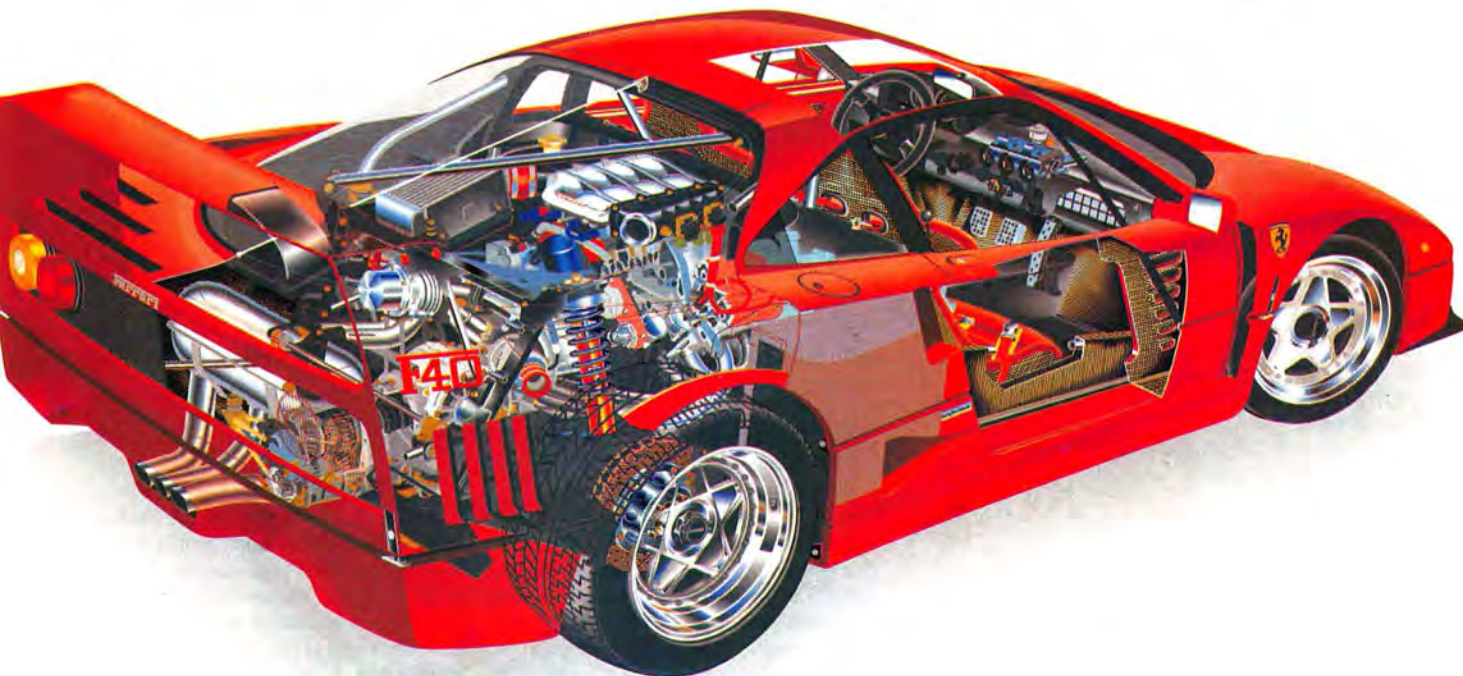
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CIRCLE 67 ON READER SERVICE CARD.

LETTERS

for the software, I could download a new ten-use program or restore the program from a backup of the original download. The pay-per-font CD-ROM approach Swaine refers to works because it doesn't count how many times you use the software, only how many items you buy at one time.

By the way, you guys once published a variety of electronic addresses for sending your E-mail. Now all I can find is U.S. Snail and an oblique reference to (PPU) ZiffNet/Mac. Do I infer correctly that you don't want speedy E-mail?

Tom Pittman

Spreckles, CA

In each issue's "How to Reach Us," on page 4, we publish both our MCI Mailbox number (424-4936) and our ZiffNet/Mac number (177000,5200). — PP

From My Perspective

Eric Taub's drawing-program comparison in the November '92 issue ("True Perspective: Drawing Programs," Buyer's Guide page 32) seemed to me to misrepresent and shortchange Aldus' SuperPaint 3.0.

"Can't convert text to outline"? Sure you can: an S typed in the painting layer and converted to a Bézier with auto-trace looks just like the others illustrated in Figure 3. "Gradient fills don't rotate with objects"? No, but you can rotate them precisely after rotating the object. "No pen tool"? True; but you can quickly and easily approximate pen-drawn objects with a polygon and then convert to a Bézier and often have almost exactly what you want right off the bat. And not a word about SuperBits, which gives dot-by-dot control at the resolution of a laser printer or a StyleWriter.

At a street price less than half that of Deneba's Canvas and less than a third that of Aldus' FreeHand or Adobe's Illustrator, SuperPaint 3.0 is an astonishingly powerful tool, with capabilities and flexibilities Mr. Taub never mentions.

Matt Neuberg

Christchurch

New Zealand

All three of the processes Mr. Neuberg describes require more work with SuperPaint 3.0 than with the other drawing programs reviewed, without achieving better results. Type converted to a bit map and then auto-traced cannot yield outlines as accurate as those taken directly from a font's outline descriptions. Why should you take two steps to rotate

a filled object when you can do it in one? Why approximate a path with a polygon tool when a real Bézier pen lets you start drawing when you click the mouse? SuperBits is nice, but the article focused on the programs' object-oriented capabilities, not their abilities as bit-map editors. — ET

V.32bis Bits

"Bargain Speedsters: V.32bis Modems" (November '92, page 176) suggests that the real world of modems is two identical modems "talking" to each other. That may be true for some corporate or university systems with hundreds of identical modems, but in the case of many users, the real world is interconnection of different makes of modems. I work with five information services, all of which have different-make modems than mine. Differing brands do not always work well together. My experience has been that certain brands consistently make a connection that is less effective than one would expect.

Bob Twitchell

Leroy, NY

E PowerBook Unum

I just wanted to second the byline credit for Russell Ito following his report on the Macintosh Duo System ("The Convertible Mac: The Macintosh Duo System," December '92, page 144). It says, "Russell Ito is a senior editor who thinks the PowerBook 100 was a good idea."

As a proud owner of a PowerBook 100, I too think it was. In fact, after Apple recently cut the prices and discontinued the PowerBook 100, it became a steal! Two months ago, I purchased a PowerBook 100 2/20 for \$599. I haven't been able to part with it since. Best of all, I haven't had this much fun with a Mac since my first Mac 512K back in 1984.

PowerBook 100 users, unite!

David Volger

Brooklyn, NY

Expressionist Impressions

I take issue with some of the points in the comparison of Expressionist 3.0 and MathType ("Expressionist 3.0 and MathType 3.0," December '92, page 77). The biggest mistake is the claim that the EGO protocol is proprietary, which it is not. In fact, I developed EGO, because Microsoft's protocol OLE, which is proprietary, was not available to me when I was developing Expressionist 3.0. EGO

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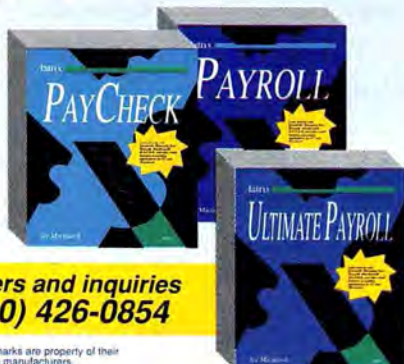
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LETTERS

has been publicly available since the beginning of 1992. It's now implemented in several packages and will be supported in the future by other packages, including MathType.

Most aggravating is the reviewer's complete omission of any mention of printout quality. Expressionist 3.0 was rewritten from the ground up, and one of the primary reasons was to meet, and challenge, the printout quality of the currently acknowledged standard in equation typesetting, the TeX markup language. The printout quality of Expressionist equations is, I believe, unsurpassed and a major advantage over MathType. Why wasn't any mention made of this in the review?

The reviewer decried the complexity of the program, briefly mentioning unique features that Expressionist has without acknowledging that these features are crucial for many users. Each feature we put into Expressionist 3.0 was requested by many users. It is a bit unfortunate that so many people asked for completely different features, but at least we're responding to people's needs.

These are just a few of the flaws I found in your review. Even so, thank you for giving airtime to mathematical software. We frequently feel squeezed out by the Microsofts and Alduses in the world, and your magazine helps us a lot.

Allan Bonadio
President
Prescience Corp.
San Francisco, CA

Because I don't have the space to respond point by point to your four-page letter, I'll summarize a few key areas. When I wrote the review of Expressionist 3.0, no other EGO-using applications were available. I'm glad that's changed. It would have been better to have called the EGO protocol "unique" instead of "proprietary."

In my tests, the printout quality of both Expressionist and MathType were pretty good, so given space restrictions, I focused on other areas.

I have no complaint about Expressionist's plenitude of features. Adding features requested by users is admirable as long as usability is preserved. Unfortunately, I did not find this to be the case with Expressionist. For example, the incredible depth of customization options is not only overkill but also makes it hard to find what you're looking for.

In your letter, you also took exception

to my criticisms of Expressionist's manual. As a software-documentation writer and manager, I have seen many examples of good and bad documentation. I stand by my opinion that the manual is unprofessional, unnecessarily hard to use, and littered with problems. Here's just one example: The only reference in the index to the TeX typesetting language notes where the word is defined. It ignores the 10 pages of important information (including a 3-page tutorial) printed 100 pages earlier. — DV

Election Letdown

John C. Dvorak's December column ("I Told You So!!!" page 376), in which he wrote about the presidential election before it was actually held, almost worked. The problem is that this issue should have been sent out to subscribers a couple of days later than it was. I got mine on October 31, four days before the election. Also, nothing has happened with Microsoft and the FTC, so that part of the column didn't work either.

Other than that, I thought it was great, like all of his other columns.

Alexei Kosut
El Granada, CA

Actually, we tried to get the election moved up, but the Bush-Quayle campaign balked. — PP

Long Live Dvorak

I am a typical 16-year-old Mac addict, and I've been a fan of the Devil's Advocate, John C. Dvorak himself, ever since I was old enough to justify my existence. Every month, when I get my typical 350-page MacUser, I ignore the three-fourths of the publication devoted to ads and the three-sixteenths' worth of reviews of overpriced high-tech industrial-strength products, skip whatever is left, and turn straight to the back.

I'm sick of all these cynics and nit-pickers ragging on him. Columns such as "Bad Dreams" (June '92, page 344) and "Swami Dearest" (October '91, page 300) are just what the industry needs, short of a smack upside the head. But "The Game of the Name" (November '92, page 362) was truly the granddaddy of them all. Talk about bust a gut laughing . . . Dvorak's one of the few people who understands what's going on in the Mac universe and how ridiculous it often seems.

Peter Richardson
Valdez, AK

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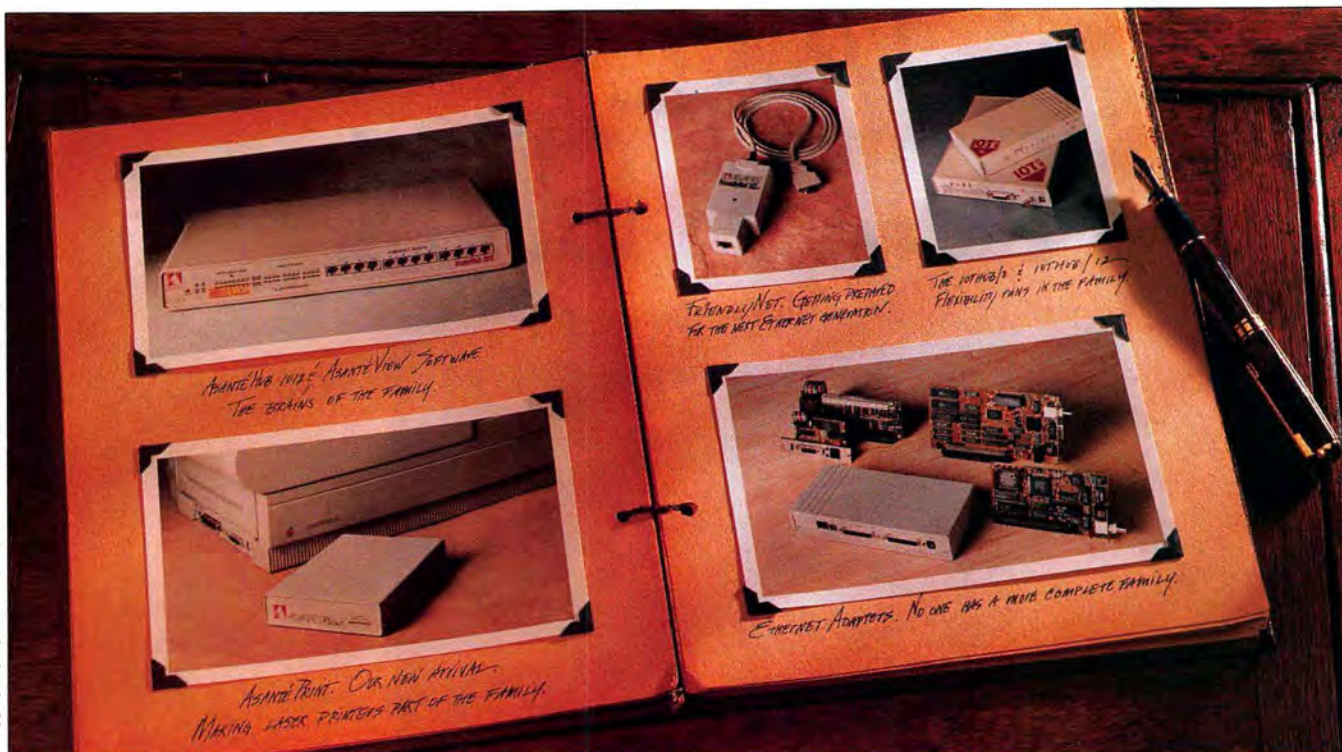
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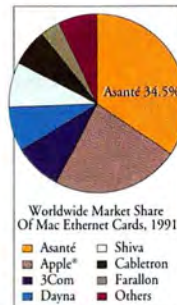
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Source: International Data Corporation, June 1992

Asanté products are available from Ingram Micro, Merisel and Tech Data.

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The Year in Preview



Want to know the winners of next year's Eddy Awards? Most of them probably haven't been invented yet — but here's a sneak preview of some early standouts.

If you still believe necessity is the mother of invention, how do you explain Chia Pets? Some of those old sayings ain't what they used to be. Here's another one: "Build a better mousetrap, and the world will beat a path to your door."

Come to think of it, the new sayings aren't all that much better. The movie *Field of Dreams* offered this updated version: "If you build it, they will come." Hmmm.

Reality, in the fast-paced Macintosh universe, demands more than just better widgets: It demands ever-better widgets. You can't ever stop improving your mousetrap if you want your customers to hang around for repeat business.

That's because, to update another old saying, there's always more than one way to skin a mouse (or to earn a five-mouse *MacUser* rating). If you don't find it, your competitors will.

In his book *The Evolution of Useful Things* (New York: Alfred A. Knopf, 1992), Henry Petroski — the John C. Dvorak of the civil-engineering world, whose previous best-seller was a 448-page book entirely about pencils — traces the origins of common household items such as paper clips and eating utensils. Along the way, he ponders how entirely different solutions to common problems have evolved in different cultures and at different times:

"Can the development of the knife and fork of the West be explained by the same principle that explains the chopsticks of the East? Can any single theory explain the shape of a Western saw, which cuts on the push stroke, as readily as an Eastern one, which cuts on the pull?"

Dueling approaches to everyday problems are even more dramatic on the Mac desktop. You'll find an ample selection of rival hardware and software solutions to choose from in this issue's salute to the finalists and winners of *MacUser's* annual Editors' Choice Awards.

And the competition for next year's awards looks to be even more intense. Here's a peek at some of the just-released or forthcoming mouse catchers that are on our preliminary list of products to watch:

Acrobat (Adobe). The first components of Adobe's electronic-document-distribution system (formerly code-named Carousel) should be in place this year, making it possible to view and annotate fully formatted,

complex documents (including PostScript files) on any computer.

AERport (Applied Engineering). This nifty device enables you to use your PowerBook as a cellular phone, with the Mac's built-in microphone and speaker substituting for a headset.

After Effects (CoSA). For high-end-video-production mavens, this innovative QuickTime-editing and -effects package combines layering and compositing with plug-in-filter technology.

Collaborative Mac (Photonics). Using infrared light, this diffuse-infrared transceiver plugs in to the printer port of any Mac or other LocalTalk-network device (such as a LaserWriter) to create automatic wireless network connections.

Component Workshop (Component Software). Developers can look forward to this innovative new tool that offers a faster and better-integrated environment for C++ programming.

Data Desk 4.0 (Data Description). A complete statistics package with graphical-analysis tools, Data Desk 4.0 supports unlimited data-set sizes.

DeltaGraph Professional 3.0 (DeltaPoint). With lots of new chart types (including pictographs), an on-line chart advisor, and an improved Excel-like interface, this new version may once again be the charting program to beat.

Digital Film (SuperMac) and MoviePak (RasterOps). Competing products from rival vendors, each claiming full-motion, full-screen video, heat up the multimedia market. How many NuBus-card slots do you have?

Dynamics (Great Plains Software). This graphical accounting and business-management tool, based on the Dexterity development system, promises to revolutionize accounting on the Mac.

Fetch (Aldus). Aldus' image-archiving and -retrieval software lets users on any network access 32,000+ images and QuickTime movies per database. Collaborative publishing on the desktop takes a giant step forward.

4th Dimension 3.0 (ACI US). Built-in multitasking makes this powerful relational-database program accessible even to casual users. Likewise, the ability to edit objects while they're in use should appeal to more-advanced users.

The Journeyman Project (Presto Studios). Travel through time with this CD-

ROM; its stunning rendered graphics will set the new standard for adventure games.

LaserWriter Pro series (Apple). With 600-dpi resolution and multiple networking and paper-handling options, Apple's new workgroup printers usher

in a new era of laser printing.

MacWrite Pro (Claris). We're still watching for this first major upgrade since MacWrite II, but Pro's modular design for plug-in extensibility should make it worth the wait.

Newton (Apple). Will 1993 be the year of the personal digital assistant? Hand-held computing becomes a reality.

Norton Essentials for PowerBook (Symantec). File-syncing and other powerful features may make this the essential utilities package for the PowerBook.

Now Up-to-Date 2.0 (Now Software). The latest version of this workgroup scheduler adds integrated to-do lists and better off-line services.

OCE (Apple). By integrating E-mail with system software, Apple's Open Collaborative Environment will change the way offices communicate.

Ofoto 2.0 (Light Source). The 1991 breakthrough-technology Eddy Award winner goes color. The new version of this scanning software adds advanced color-correction features to an already formidable product.

PageMaker 5.0 (Aldus); QuarkXPress 3.2 (Quark); Ready,Set,Go! 6.0 (Manhattan Graphics). The top three page-layout programs have new versions in the works, each promising to add features that address the weaknesses of the others.

Phaser 200i (Tektronix). Is thermal-wax printing dead? Not according to Tektronix, whose innovative ColorCoat technology prints glossy color on plain paper.

ProofPositive Printers (SuperMac). An Adobe PostScript Level 2 software RIP coupled with a full-bleed image size and color-savvy software makes these dye-sub the ones to watch.

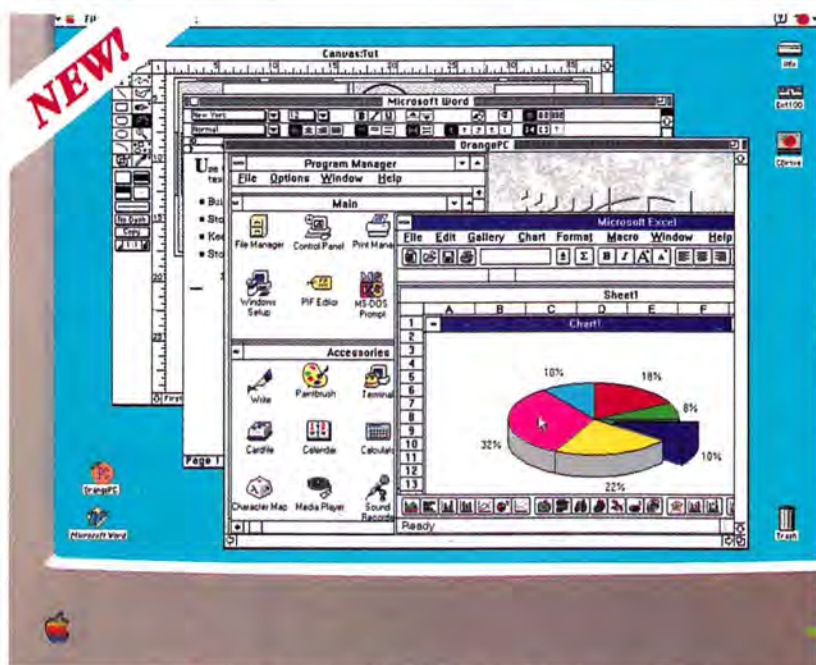
Retrospect 2.0 (Dantz). The premier backup program gets even better, with an improved user interface and support for more devices.

Spectre Supreme (Velocity). One of 1991's hottest games gets an overhaul, with more levels of difficulty and even-more-sophisticated graphics.

Spreadbase (Objective Software). Take the familiarity and ease of use of a traditional spreadsheet program and graft it onto a powerful relational-database engine, and you've got a new breed of data-crunching software.

Stacker for Macintosh (Stac). The next step in driver-level compression, this full-featured (and partition-sensitive) utility provides faster compression.

Timbuktu 5.0 (Farallon). With its added Windows support, Timbuktu lets users go from Windows to Mac and back. Imagine: power-hungry Mac users seizing control of coworkers' PCs. ☞



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AutoDoubler, the solution to your hard disk space problems, is now available in a 10-pack.

"The true beauty of AutoDoubler is its complete invisibility."

— Publish magazine, 2/92



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— David Pogue, MacWorld, 3/92

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CIRCLE 124 ON READER SERVICE CARD.

Right-Protected Software



Does the small print on that envelope your new software disks came in protect the company's rights or violate yours?

When you open a brand-new piece of software and see the licensing agreement, I hope you do what any responsible consumer would do: Toss it out, and see if there's a free T-shirt offer or something inside the box. I mean, look at all that teeny-weeny type and words with so many syllables you'd think you were reading the ingredients of a name-brand diet cola. With more than 50 episodes of "Rocky and Bullwinkle" currently available on home video, we all have better things to do.

Well, I don't, as it happens. So to spare you the trouble of reading and figuring out all those licenses yourself, I've put together a simple glossary to make it clear how the small print really affects your rights.

Usage License

Small print: This licensed software is the property of DiscoWare, Inc., including the software, documentation, and media, and may be reclaimed by DiscoWare at any time.

Translation: Just because you laid out 500 clams for this program and were sent a pile of disks and manuals, don't get the impression you've actually *bought* anything.

This section of the agreement makes a few very important points. First and foremost, *we're selling you only our permission to use the software and not the software itself*. So take good care of the paper the licensing agreement's printed on, because you paid \$500 for it! Publishers do this because when the disks and manuals remain their own property, they're relieved of certain inconvenient obligations as vendors. It reinforces the point that they still own all the rights to the program (copyrights, trademarks, and so on), but it also leaves no doubt about your rights, or lack thereof, to make copies and use the software as you see fit.

Which brings us to the next blurb in the usage license, which is usually the One User, One License statement, also known as the If You Make a Jillion Bootleg Copies We'll Sic a Water Moccasin on Your House Pets clause. Sensible enough, so let's move on after mentioning that the Supreme Court says that it's cool if you want to make one backup copy. You and only you have permission to *use* the program, so technically you're not supposed to leave it on a Mac for public use or put it on a file server so other folks can use it, one at a time. The funny thing is, they sometimes throw in another clause stating categorically

that no, this software is licensed for one *machine* only, not one user. The upshot of this is that if you want to run DiscoWriter on both your desktop Mac and your PowerBook, you'll have to own two copies if you don't want to break the law.

The last important consequence of this clause refers to your rights as a property owner or, more accurately, the sudden lack thereof. Because of the You Don't Actually Own Anything concept, that licensing agreement states specifically that you can't sell the piece of software to someone else to reclaim a few bucks if you outgrow it. Some spell out for you a procedure by which you can transfer the license, but most just say no way.

No, really: But, of course, this is just the legalesepeak. The real meat of this section is an admonition not to copy that floppy, and if you take that bit as seriously as you take the Shirt and Shoes Required sign at the Seven-Eleven, they'll let you slide on the rest. Most companies are content with your following the One Working Copy at a Time rule, meaning that you can make as many copies as you want, as long as only one copy is actually in use at any given moment. They also couldn't care less if you sell your secondhand software. They might refuse the new owner access to technical support or product upgrades, but if you sell the package complete (with all the disks and manuals), most of them will just ask you to write them a letter formally transferring ownership — I mean, the *license* — to the new licensee.

Warranty/Disclaimer

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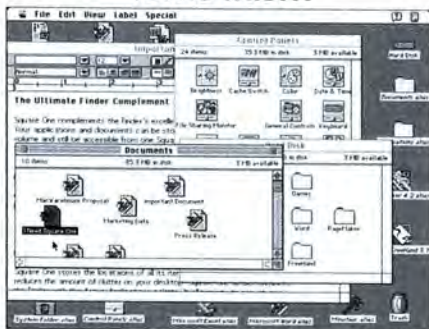
Translation: Well, bless their little hearts — if, after spending a wheelbarrowful of dough on their software, I find that it's so full of bugs that it makes my Mac spit out pea soup through the disk slot, they're bighearted enough to give me a brand-new disk.

No kidding, some of the warranty disclaimers can be downright scary. Some of the more baroque ones go so far as to say that not only won't they refund your money on that bug-ridden software from Muspelheim but also they make no promises that they'll actually fix the problems.

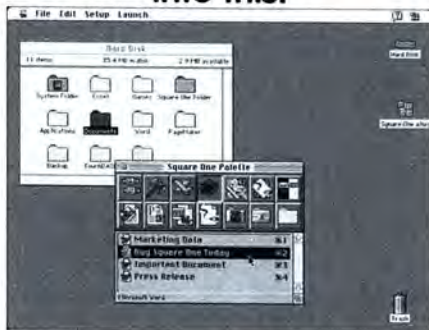
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30 March 1993 MacUser

ANDY IHNATKO

No, really: You really shouldn't worry about this clause in any event; it just says that they're not promising to keep updating and supporting DiscoWriter into the next millennium, necessarily, and although any software company of any decency whatsoever has enough pride in their product that they'll stomp out all known bugs mercilessly as they're discovered, if there's a minor one they just can't track down that affects only a small percentage of their users, well, they're not going to let it distract them from their usual four-o'clock all-office Twister competition.

Worried that this clause lets companies rush totally unusable crash-and-burn-type software onto the market with impunity? Fret not; this little trifle won't insulate them from the consequences of lousy programming. Whether it's software or auto parts, The Law doesn't look kindly on products that don't work as advertised. You can also wave the magic Implied Warranty of Merchantability wand. This universal consumer concept says that the buyer has to assume that a product or service will function reasonably well, and although it's being explicitly dismissed in the agreement in the above example, it *cannot* be waived in most of America. Check with your state's office of consumer affairs. Ditto for agreements that state, "Look, the biggest refund you're getting is 85 percent of the purchase price under any circumstances." That's just plain *wrong*. Normally this isn't your worry — most reputable software vendors will happily refund your money and then vent their ire on the publisher — but still, remember that you don't have to take that kind of horse hockey.

Liability

Small print: Under no circumstances will DiscoWare, Inc., be liable for any lost profits or incidental or consequential damages claimed by or for any party.

Translation: Pretty straightforward, for once. Basically, they're talking about a situation such as the software program crashing right before an important deadline or an error in a tax-accounting program causing your firm to be audited or something.

No, really: The legal sachems I consulted were divided on this one. Although all of them conceded that this statement would indeed free DiscoWare from almost all liability, there was the vocal

opinion that if DiscoWare knew there was a bug in their tax software and then willfully concealed this information from users, the company would truly be on the hook for *beaucoup* lawsuits. Ditto if they willfully gave you misinformation.

You Break It, You Bought It

Small print: By breaking this seal, you denote your acceptance of this License and will be subject to its terms.

Translation: You know the drill — opening the envelope means that you've read the agreement and that you agree to abide by it, including the part about taking down the programmer's storm windows every spring. The usual way to get a nice and legal document is to collect thereupon the signatures of all those concerned. Of course, doing so is impossible, so all this Kreskin-like label/envelope business was the best the legal folks could come up with.

No, really: I thought I'd mention this bit because curiously enough, there's been a lot of debate about whether or not this whole seal-breaking business results in a legally-agreed-to document. For one, many companies just toss the disks into the box and state that by tearing the shrink-wrap on the box, you've agreed to the license. This is nonsense, because you didn't have a chance to read the agreement first and so you're not bound.

What if you opened the box, got to that envelope, read the agreement, and decided that it was yet another yoke forged by the ruling class and you wanted none of it? Many software vendors won't take a program back once the shrink-wrap has been broken; therefore the user has no choice but to keep the software, and therefore it ain't a binding agreement.

One more thing to say before I sign off this month: Licensing agreements are legal documents, and as such, they're really not designed to be friendly, comforting instruments of peace. They sound pretty harsh, but really, for the most part, they're all bark and no bite. When you call up a software company directly to ask for clarification on one or more points, you'll probably find the person you talk to more than eager to play Good Cop to their lawyer's Bad Cop.

Except where the software-piracy thing is concerned. I have a missing show poodle and a backyard full of water-moccasin tracks to prove it. ☹

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Best 3D Program

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MacroModel

MacroModel provides comprehensive three-dimensional modeling. It's designed to serve a wide range of modeling needs including 3D illustrations for desktop publishing, 3D CAD-accurate product prototyping and more. Macromedia #06310



Best Animation Program

\$798

MacroMind Director 3.1

Director offers one of the most complete authoring environments for creating interactive presentations that can be controlled by the user or viewer. New version 3.1 has full QuickTime and System 7 support! Macromedia #00839



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Morph

The hottest movie image effect of the 90s is now available on the Mac! Morph smoothly transforms one image into another. This is the same effect which has astounded audiences all over the world. Gryphon #05925



Best Multimedia/Sound Product

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Action 1.0

This revolutionary application lets you create dazzling presentations instantly. With Action 1.0 you'll quickly and easily combine sound, motion, text, graphics, animation and interactively to create super presentations. Macromedia #06247



Best Desktop/Video Product

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Produce attention-grabbing video movies on your computer: Adobe Premiere is a simple yet powerful user interface for visually combining QuickTime video footage, audio recordings, animations, still images and graphics to create exciting new digital movie effects. Utilizes plug-in filters, including those for Photoshop. Adobe #04670



Best Desktop Diversion

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Star Trek: The Screen Saver

New from the makers of After Dark, one of our all-time best selling screen savers, comes Star Trek: The Screen Saver. It saves your monitor from phosphor burn-in with fantastic displays based on the original Star Trek series. Berkeley Systems #05934



Best Network/Connectivity Software

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Net Distributor Pro

NetDistributor Pro installs software updates, including applications, fonts and desk accessories, anywhere and anytime to networked Macintoshes across LocalTalk, EtherTalk, TokenTalk, and WAN links. Trik #05736



Best Input Device

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Turbo Mouse Trackball Version 4.0

Operate your computer at turbo Speed! Kensington's Turbo Mouse has won more awards for Best Macintosh Input Device than any other. It features a large ball for greater control and comfortably positioned buttons. Kensington #05176



Best Page Design Program

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Aldus Personal Press 2.0

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Aldus IntelliDraw

New from Aldus, IntelliDraw is an exciting new type of drawing program that gives you an easy new way to visually experiment, refine and draw your ideas. Full text and drawing options provide the flexibility you need. Aldus #05481



Best Accelerator Board

\$849

ThunderStorm

Put some thunder in Adobe Photoshop with ThunderStorm, the accelerator that speeds special effects in Adobe Photoshop by as much as 2,300 percent! Explore your creative potential. SuperMac #05797

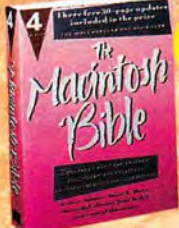


Best Information Product

\$24

The Macintosh Bible, 4th Edition

The 4th edition of this all-time-best-selling book is here! It's 1200+ pages crammed with tips, tricks and shortcuts for getting the most out of your Mac. Peachpit Press #06032



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Best Productivity Program



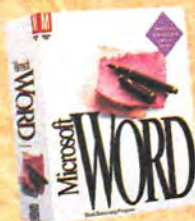
\$196

GreatWorks 2.0

GreatWorks integrates the functionality of eight feature-rich applications. You'll get started fast, and more importantly, keep on working fast, so you'll spend less time spinning your wheels and more time getting things done.

Symantec #00458 ✓

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Microsoft Word provides depth of function and ease-of-use like no other word processor on the market today. The all new version 5.1 is even easier than ever to use.

Microsoft #04898 ✓

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Microsoft Excel 4.0

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Microsoft #00227

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all your business and presentation needs with DeltaGraph Professional. Every aspect of your charts and presentations is under your control: formatting options, built-in custom chart templates and more. DeltaPoint #04805 ✓

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This integrated collection of utilities designed specifically for the needs of Mac PowerBook users, gives you longer battery life, security, display enhancements, improved responsiveness and much more.

Connectix #05646

Best Financial Program



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M.Y.O.B. for the Mac

M.Y.O.B. sets the standard for easy to use, interactive accounting software. Even first time users and non-accountants can control every facet of their business—financial reports, checkbook reconciliation, receivables, inventory and more. Macworld World Class Award Winner.

Teleware #04712

Create 3D Stunning Type Effects with Altsys and Pixar

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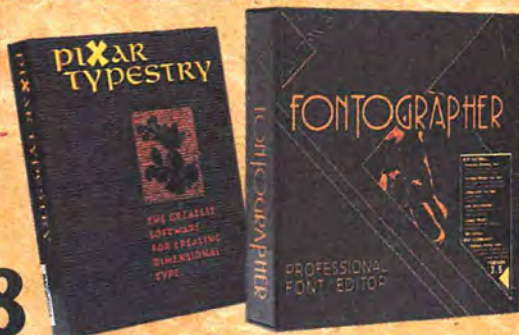
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Altsys/Pixar #06062

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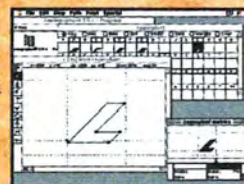
Altsys #04537 ****



Pixar Typestry

With Pixar Typestry you'll create exciting dimensional text from Type 1 and TrueType fonts. Typestry invokes RenderMan magic to transform a simple word into an extraordinary three-dimensional picture. It's ideal for creating images for logos, publishing, design, presentation graphics or multimedia. \$299 Suggested Retail Price. Pixar #05668 ****

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00932	QD 2040 40 MB Tape	\$19
01158	Sony 10 Pk DS/DD 800K Disks	\$12
02192	Sony 10 Pk DS/HD 1.44MB Disks	\$14
00938	Sony 50 Pk DS/DD 800K Disks	\$39
02193	Sony 50 Pk DS/HD 1.44MB Disks	\$75

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Kensington ✓

02979	Apple Security Kit System	\$32
04688	Basic Briefcase	\$44
00329	Compact Mac Keyboard Shelf	\$39
04690	Deluxe Briefcase	\$78
05896	Kensington MasterPiece Remote	\$114
05177	Kensington NoteBook KeyPad	\$98
03495	Kensington Side Clip	\$6
00330	Keyboard Slideaway	\$34
04427	Laserstand Mac	\$128
03346	PowerBa cker 450	\$337
03339	Power Tree 10	\$18
03342	Power Tree 20	\$27
03343	Power Tree 50	\$54
05178	PowerBacker 600	\$328
05177	PowerBook KeyPad	\$98
03350	Printer Muffler 80	\$43
04425	Printer Muffler 80 Stand	\$19
03357	Security System for Laserwriter II	\$32
04426	Space Saving Printer Stand	\$19
05175	Space Saving Printer Stand	\$30
02976	Tilt Swvl For SEor SE/30	\$21
05176	Turbo Mouse 4.0	\$106
03355	Universal Copy Stand	\$22
02977	Universal Printer Stand	\$25

BUSINESS

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00588	Inspiration	\$158
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Chena Software ✓

00334	Fair Witness V 1.1	\$178
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Claris

03478	FileMaker Pro 2.0	\$198
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05571	FileMaker Pro 2.0 Version Upgrade	\$88
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04140	MacProject Pro	\$398
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05031	MacProject Pro Version Upgrade	\$98
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Contact Software

06231	ACTI for Mac	\$254
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Fisher Idea Systems, Inc.

00897	Idea Fisher 2.0	\$378
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Jian Tools ✓

04257	Biz Plan Builder	\$84
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04996	Livingtrustbuilder	\$99
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Leister Productions

05984	Reunion - The Family Tree Software	\$114
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Lotus Corporation

00518	Lotus 123 Mac	
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00507	Competitive Upgrade	\$94
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00507	Lotus 123 Mac Prerelease Price	\$328
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Microsoft Corporation

00427	Microsoft Office 3.0	\$474
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00567	MS Works 3.0	\$158
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01220	MS PowerPoint 3.0	\$244
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04161	MS Project 3.0 for the Mac	\$444
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06184	MS Project 3.0 Upgr. for the Mac	\$148
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04076	MS Schedule+20Pk 1.0	\$539
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04077	MS Schedule+5Pk	\$139
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00227	MS Excel 4.0	\$294
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04545	MS Excel 4.0 Version Upgrade	\$88
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04898	MS Word 5.0 Mac	\$294
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00596	Word 5.0 Mac Version Upgrade	\$124
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Mainstay

01159	Mac Flow 3.7	\$214
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Softsync

00344	Accountant Inc. 3.01	\$328
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04778	Accountant Inc. MultiUser 3.5 3-User Pk	\$668
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WordPerfect Corporation

03972	WordPerfect 2.1	\$284
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05013	WordPerfect 2.1 Version Upgrade	\$69
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GRAPHICS

3G Graphics

05601	Images with Impact! Accents & Borders 2	\$78
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11902	Images with Impact! CD ROM	\$248
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Adobe Systems Inc.

04983	Illustrator 3.2 w/ ATM	\$364
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04042	PhotoShop 2.5	\$548
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Adus

06319	Fetch	\$189
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00333	Freehand 3.1	\$393
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05481	IntelliDraw	\$194
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04573	Pagemaker V4.2	\$494
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00346	Persuasion 2.1	\$324
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04190	Superpaint 3.0	\$98
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Caere Corporation

04173	Omnipage 3.0	\$458
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05161	Omnipage Direct 1.0	\$274
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01005	Omnipage Pro 2.1	\$648
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Calliscope

00634	Satellite 3D	\$128
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Computer Associates

00203	Cricket Graph 1.3.2	\$124
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01475	Cricket Presents	\$134
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Deneba

00803	Canvas 3.0	\$258
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Light Source

00657	Olofo	\$279
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MacroMedia

04498	Model Shop II 1.0	\$618
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05835	Swivel 3D Pro 2.0 Upgr w/ Serial	\$98
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03619	Swivel 3D Professional	\$434
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Strata

04088	Stratavision 3D 2.5	\$628
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Type Solutions, Inc.

00490	PRO 2.0	\$70
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Vividus

05634	Cinemation	\$354
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EDUCATION

Brøderbund

00892	Geometry	\$57
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05479	Mac USA	\$34
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01985	Physics	\$57
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05638	Where in America's Past	\$36
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02488	Where in the USA is Carmen	\$28
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03513	Where in Time is Carmen San Diego	\$28
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Davidson & Associates

00825	Math Blaster Plus	\$34
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00225	Speed Reader	\$28
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04577	Spell It Plus	\$28
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Great Wave

00391	Numbermaze - Color	\$34
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04248	Reading Maze - Color	\$34
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Hyperglot Software Co.

03739	Hyperglot Spanish Tense Tutor	\$38
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03744	French Tense Tutor	\$41
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05440	Berlitz Think & Talk Italian CD-ROM	\$118
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Learning Company

02593	Talking Math Rabbit	\$35
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The Learning Company

01856	Reader Rabbit 1	\$35
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Nordic Software

03101	Mackids Preschool Pack	\$34
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01931	Turbo Math Facts	\$24
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03102	Word Quest	\$30
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ENTERTAINMENT

Activision

05997	Rodney's FunScreen	\$28
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01916	Sargon IV	\$27
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Amtex S/W Corp

00600	Tristan Pin Ball	\$39
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Broderbund

06108	Arthur's Teacher Trouble	\$44
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05678	PlayMaker Football Mac - Color	\$31
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05649	Prince of Persia	\$31
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04197	The Playroom 2.0 Mac	\$28
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Casady and Greene, Inc. ✓

04581	Aqua Blooper Piper	\$29
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04580	Glider 4.0	\$29
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04582	Fun Bundle	\$59
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05047	Mission Thunderbolt	\$44
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Microsoft Corporation ✓

04293	Flight Simulator 4.0 Mac	\$39
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Inline Design ✓

03599	3 In Three	\$31
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06015	Cogito	\$38
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03494	Darwin's Dilema	\$31
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06170	S.C.O.U.T.	\$38
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03934	Tesseract	\$31
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Interplay

04134	Battle Chess	\$29
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05537	Battle Chess - CD-ROM	\$42
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06160	Omar Sharif on Bridge	\$34
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06161	Out of This World	\$36
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Spectrum Holobyte

04813	Wordtris	\$29
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UTILITIES

Alysis

00512	Super Disk !	\$48
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ASD Software Inc.

03286	FileGuard	\$138
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Casady and Greene, Inc.

04810	Super Quick Dex	\$49
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Dantz

04722	Disk Fit Pro 1.1	\$72
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02586	Retrospect 1.3	\$146
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Fifth Generation

02194	Pyrol 4.1 for Mac	\$26
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04955	Auto Doubler 2.0	\$58
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Inline Design

00638	INITPicker 3.0	\$46
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06016	Inline Sync	\$82
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Salient

04955	Auto Doubler	\$58
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03515	Disk Doubler 3.7	\$44
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Symantec

02071	Just Enough Pascal	\$51
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04464	More 3.1	\$264
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04890	Norton Utilities 2.0	\$94
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06166	Norton Essentials for PowerBook	\$68
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00458	GreatWorks V.2	\$196
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Teknosys, Inc.

00867	Help 1.04	\$88
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Terranetics

00863	Autoback	\$94
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Thought I Could

04762	Wallpaper	\$36
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Visionary Software

04448	First Things First 3.0	\$49
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03112	Synchronicity for Mac	\$34
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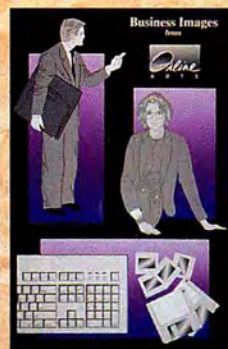
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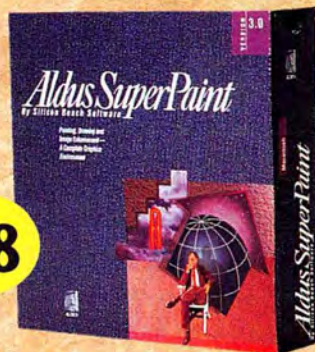
Business Images includes over 160 ready-to-use PostScript clip art graphics. You can have professional quality artwork to enhance your business publications, newsletters, brochures, advertisements, memos or any printed piece. This package includes the images most requested by professional artists, including: people, computers, equipment, symbols, hands, phrases, backgrounds and much more. Online Arts #00178



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Aldus SuperPaint 3.0

New Aldus SuperPaint 3.0 is the complete painting, drawing and image enhancement package for the Mac. It supports 1- through 24-bit color, textures, gradients, masking, color balancing, AutoTrace, Beziers and EPS graphics support. Aldus #04190 ✓



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Voyager publishes interactive CD-ROM software that makes music, video and text come alive on your Mac. The titles cover many areas and each delivers work that is original, innovative and entertaining.



A Silly Noisy House

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Let your kids romp through this animated CD-ROM playhouse. They'll listen to terrific-sounding nursery rhymes while playing with the teddy bears. Voyager #06146

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A truly original collection of dazzling stories and witty animations. Join the Tuli-bugs and Mr. Rotato Head in this artful and entertaining CD collection. Voyager #06145



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Baseball's Greatest Hits

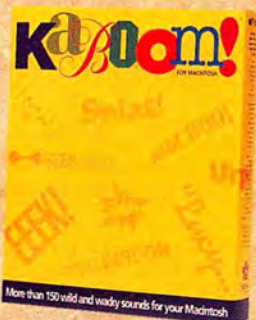
Over 6 hours of CD-ROM audio will score well for fans. Features the actual play-by-play calls for 65 historic baseball events. Video movies of Hank's 715th and others add to the huge collection of stats, photos and memorabilia. Voyager #06135



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Kaboom!

Replace those factory-issue beeps with traffic jams, screams, explosions, morning birds, police sirens and more. Each sound can be played every time you start up your computer, insert a disk, etc. Amaze your friends with the sounds of ringing phones, barnyard animals and a true-to-life rocket lift-off. Nova Development #05268



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NetModem/E 10BASE-T

NetModem/E from Shiva provides complete dial-in, dial-out and remote routing for

AppleTalk, Ethernet and Novell

NetWare networks. This comprehensive stand-alone Ethernet communications device meets three important LAN communications needs: 1) It allows remote workstations to dial in and have full access to network services; 2) It lets LAN workstations call out to remote information services or hosts; and 3) It joins geographically separated networks via a routing connection over ordinary phone lines. NetModem E also supports Macintosh and PC computers on AppleTalk and Novell NetWare networks. It switches automatically to accommodate both Macs and PCs. Shiva Corporation #04129

- #04491 Shiva NetModem/E Thin 4\$1484
- #04758 Shiva NetModem/E Thick ✓\$1484
- #04759 Shiva NetModem/E AAUI ✓\$1484



NEW PRODUCT

\$1758

LanRover/E for AppleTalk

You can't afford to spend all your time running around the building configuring, checking and troubleshooting a lot of dedicated Macintosh computers used for remote networking. LanRover/E solves all the problems associated with remote networking (security, management, ease of use, scalability and affordability) and solves them with this one powerful, rack-mountable package.

LanRover/E consolidates all remote networking components and software in a single unit, so you can configure and manage everything from one central location. This multi-port remote networking server for networks running either Novell NetWare or AppleTalk Remote Access (ARA) over Ethernet is available in 4-port or 8-port configurations. Shiva #06101

- #06102 LanRover/8E for AppleTalk ✓\$2628
- #06291 LanRover/4E for Novell ✓\$1758
- #06292 LanRover/8E for Novell ✓\$2628

\$81

White Knight 11

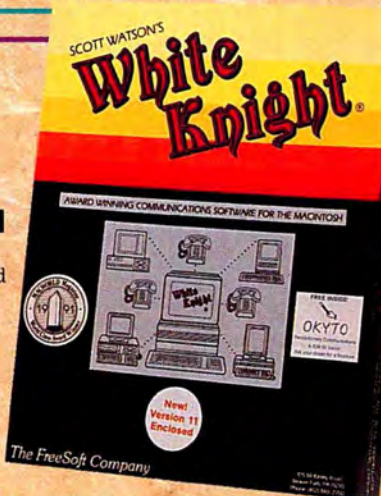
White Knight 11 (previously known as Red Ryder) has been called the best all-around telecommunications program available. It gives you technical sophistication, flexibility and user-friendliness—at a great price. The newest version includes more than 100 all-new features! Freesoft #02881

"White Knight is probably the best communications program on the market, combining technical sophistication, flexibility, user-friendliness and a bargain-basement price. It deserves more than an unqualified recommendation. It should be a mandatory buy for anyone with a Macintosh and a modem."

— Computer Comment, United Press Int'l

"White Knight is one of the best values in communications software, and with Okyto thrown in (a \$39.95 value when purchased separately), it's an even better bargain. White Knight continues the tradition of supporting every possible feature that its users could want and then some."

— MacUser magazine.



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Service organizations, computer dealers, consultants and end users will save time and money with this powerful and easy-to-use tool. Comes with an intelligent manual that leads you through the troubleshooting process. Snoopers complete diagnostic system checks RAM, audio, video, SCSI, I/O testing, loopback connectors, error logging, performance (benchmarks for CPU, Math, memory, etc.) and more. The same SNOOPER software runs on all Macs.

MAXA Corp. #05025 ✓

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Now the easiest way to do your taxes is with your computer and MacInTax. Only MacInTax has EasyStep, a revolutionary new tax preparation system that leads you through your tax return from start to finish, guiding you every step of the way. MacInTax is complete; it comes with everything you need to

do your taxes quickly and accurately, including over

90 forms, schedules and worksheets, complete IRS instructions, tax help in plain English, itemizations and EasyStep. You can print MacInTax's IRS-approved forms on most printers.

Enter your data into the headstart version 10.0 now and send in the registration to ChipSoft. You'll automatically receive the final version 10.1 with IRS-approved forms in January 1993. ChipSoft #06164

Even complicated returns are easy—thanks to EasyStep.

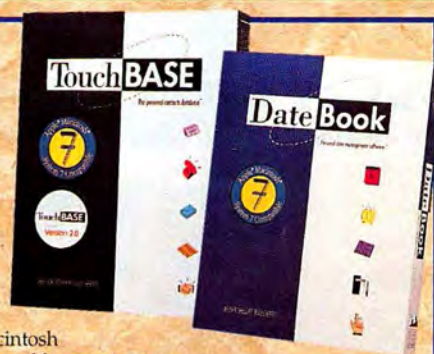
You choose the level of help you need. If a step doesn't apply to you—skip it. If you only need help with one part of your return—turn to EasyStep for just that section. Or, let EasyStep hold your hand through the entire process. And, because it shows you where each number goes on your return, you'll always understand what the program is doing, and why. You remain in control—not at the mercy of a "black box" interview.

#06188 MacInTax 1040/Quicken Bundle \$64

\$94

DateBook/ TouchBASE Bundle

Keep your professional life running smoothly with DateBook, the Macintosh personal organizer that enables you to enter and keep track of appointments, schedules and things-to-do. DateBook prints monthly, weekly and daily schedules as well as FiloFAX and DayTimer formats.



Selected DateBook Features

- View your schedule any way you like
- Alarms remind you of important events
- To-do lists keep you on track

TouchBASE 2.0 just might be the most functional piece of Mac software you'll ever purchase. TouchBASE is a database which keeps track of personal and business contacts. It remains handy all the time—no matter what application you're using. The intuitive interface makes it a breeze to learn and use. After Hours Software #06167

Selected TouchBase Features

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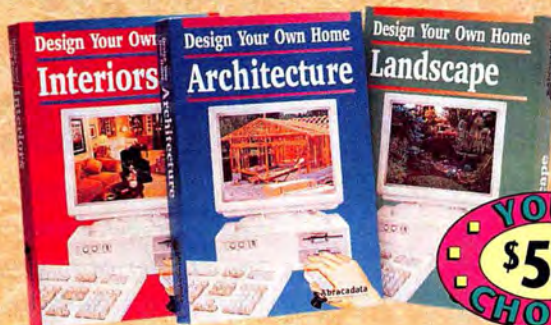
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Whether you are a professional or a do-it-yourselfer, the Design Your Own Home series can make your planning time more productive.

Each program includes sample plans and a try-out section to get you started, plus command cards to keep by your side as you work. There are 3 programs: **Architecture** takes you from floor plans to structural details. You can side view building plans and the overlay feature allows layering of details such as electrical or plumbing schematics and multiple floors.

Interiors makes it easy to plan the decor of your home or office. Use the drawing tools and supplied patterns to bring your interiors to life! View any room from the top or from four different automatic side-view perspectives.

When you're ready to start planning the grounds, **Landscape** lets you see how it will look before you plow and plant. Use the built-in object library or draw your own trees, shrubs, etc., then automatically see your design from four different side-view perspectives. Prints plans and plant shopping lists. Abracadata ✓

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CIRCLE 73 ON READER SERVICE CARD.



My Evil Grin



Why can't Bill Gates count? And other worthy questions.

I believe that my tooth kept me from being tapped to be part of President Clinton's economic team.

Twelve years of Reaganomics took a terrible toll on my teeth. One tooth in particular was badly in need of a retread: It was completely bald and tended to skid on wet food. My dentist, Dr. Daub, explained that I could have a gold cap or a porcelain cap for the same price. I was surprised that gold was not more expensive.

I'm often surprised by the prices of things. A German friend had called the week before to tell me that flights between the States and Germany that week were cheaper than between German cities. Friends of his in Munich were flying to New York to shop for clothes. Why didn't I come for a visit? he asked, and while I was at it, bring along some size-44 suits.

But with that tooth staring me in the face, I couldn't afford to start airlifting suits to Munich. I told Dr. Daub I wanted gold, having in mind a vague romantic image of gypsies and pirates, which was probably not quite the image the president had in mind. The president has said that the people he chose "look like America," but I think that a few of them look like the sort of people who would fly to New York to shop for clothes. But that's America too, I guess, and it's probably all for the best, and although my gold-capped tooth is a back molar and doesn't show unless I grimace in a way that makes my jaw hurt and my dog nervous, at least I know it's there — not to mention the resale value. I only wish I had a better grasp of the value of things.

The Man Who Fell to Worth

Take electronic calculators. The bottom fell out of the calculator market in 1974, the year before the personal-computer revolution began. (I once wrote a book arguing that the personal-computer revolution began when and where it did *because* the bottom fell out of the calculator market.) From 1974 to the present day, the price of calculators has lain where it fell. A powerful multifunction calculator can be had for the price of a floppy disk. Calculators have been miniaturized to the size of a credit card (or watch or tie tack — I haven't checked the Home Shopping Network this week). And for most of this time, programmers have been writing calculator programs for personal computers and

trying to sell them. Now let's think this through: A calculator program has to sell for more than the real calculator you were given last month for listening to an insurance sales rep's pitch. It has to be distributed on a floppy disk, which is bigger than many real calculators. And it requires a computer to make it work, whereas the real calculator runs on a NiCad battery. There's a market here?

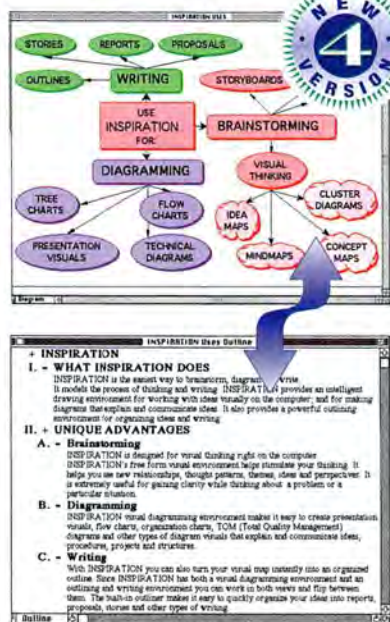
It's not just prices. I don't understand college credits either. My local junior college assigns three credits to English 34, in which students study six to eight Shakespeare plays, several intensively. It also gives three credits for learning Excel. Now I admit that that sounds about right to me, but if pressed to justify it, I couldn't. Is Excel equal in educational value to English 34 because the ideas in Excel are six to eight times as weighty as those in *Othello* and *King Lear*, or because the language of Microsoft's documentation is six to eight times as difficult as Elizabethan English? I'm not sure.

Oscar Wilde said that a cynic is one who knows the price of everything and the value of nothing. I'm confused about both. Take the PowerBook. I'm not confused about its value for Apple or for third-party developers; the PowerBook is the most successful product launch in Apple's history, with more than a billion dollars in sales in the first year. For that matter, it's probably the most successful launch of any microcomputer product ever — even surpassing the first year of IBM's original PC. A couple of facts do give me pause, though: specifically, that Apple has already discontinued half the PowerBook models and that no PowerBook has an upgrade path. And black-and-white? In 1993? But sales say that these PowerBooks are a great value for the people who are buying them, so I must be wrong.

We acquire our fundamental values early in life, and I fear that my exposure to programming languages at a critical stage in my personal development left me confused about values. In programming, it's often desirable to defer evaluation of expressions, working strictly at an abstract, symbolic level as long as possible. Symbols take on first-class status, and the values they represent become mere baggage. This kind of detached, ethereal way of thinking can leave one a little warped, unable to appreciate the value of knowing the value of anything. At least that's my theory.

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Maybe that's what happened to Microsoft chairman Bill Gates. He has, off and on, signed himself "William H. Gates," "William H. Gates, Jr.," and "William H. Gates III." You'd think he'd know how many William H. Gateses had preceded him, and in fact he does. Billion-dollar Bill is the fourth successive William Henry in the Gates line, but I guess he can call himself whatever he wants. It's just that this is the second piece of evidence that Chairman Bill considers all small integers interchangeable. The first clue was Microsoft's releasing the first user-ready version of its Windows product with a version number of 3.0. But it's his product, and he can number it whatever he wants. Still, if we follow these clues to their logical end, we can only conclude that Bill Gates is blind to differences in small integers. Just as a person who's red/green color-blind sees red and green as the same color, Bill sees numbers between 1 and 4 as the same. It's a theory, I admit, but such a touch of Gatesian innumeracy would explain why the ROM code in the first IBM PC couldn't multiply, and it just might explain why learning Excel is worth three credits. To be on the safe side, I'm not having Bill balance my checkbook anymore.

The Shrink-Wrap Crusade

Alan Wachtel may have trouble balancing his checkbook if he follows through on his idea about as-is checks. Wachtel, a devoted reader of this column and an exemplary human being in all regards, wrote to chastise me for suggesting in January that shrink-wrap license agreements could be enforced. He sent along a copy of a letter he'd sent to the Software Publishers Association. The gist of the letter, too long to reproduce here, was that such license agreements are neither licenses nor agreements, that they are a transparently improper way of doing business, that some of the terms they customarily include are unconscionable, and that their use in the industry ought to be discontinued.

Hear, hear.

Wachtel objects in particular to the after-sale disclaimer that the software is being provided on an as-is basis. He wonders "whether a publisher would consider it a fair and reasonable business practice if I were to purchase a product directly, pay for it with a check, receive it and put it into use, and then send a

follow-up letter saying, 'By the way, my check is provided as is, without warranty of any kind. The entire risk as to the results and performance of the check is assumed by you. I do warrant that the paper on which the check is written is free from defects in materials and workmanship under normal use and service.'"


But don't try Wachtel's as-is-check scheme. The joke will almost certainly fall flat. You might, however, consider

**A touch of Gatesian
innumeracy would
explain why the ROM
code in the first IBM PC
couldn't multiply, and it
just might explain why
learning Excel is
worth three credits.**

emulating him in another way: You might write a letter to the Software Publishers Association politely suggesting that its members stop using shrink-wrap license agreements.

The time will never be better for sending such a message to the SPA. By an odd coincidence, three Macintosh columnists have written about shrink-wrap licenses in the first months of this year. Steve Levy wrote about them in his *Macworld* column in January, our own Andy Ihnatko addresses the topic in this issue, and I devoted all of January's column and part of this month's to shrink-wrap licenses. With all of us columnists coincidentally jumping on shrink-wrap at the same time, that wrap would really rip for good if you just added your opinion. A hundred thousand letters complaining about shrink-wrap licenses dropped on the desks of the Software Publishers Association this month would carry some weight, I assure you.

If you think it's time for shrink-wrap licenses to go, just say that in a letter to:
Software Publishers Association
1730 M Street, N.W., Suite 700
Washington, DC 20036

Shrink-wrap license agreements are such nonsense and Wachtel's letter skewers them so pointedly that I found myself grinning widely as I read it. But then my dog growled at me, and I had to stop. 

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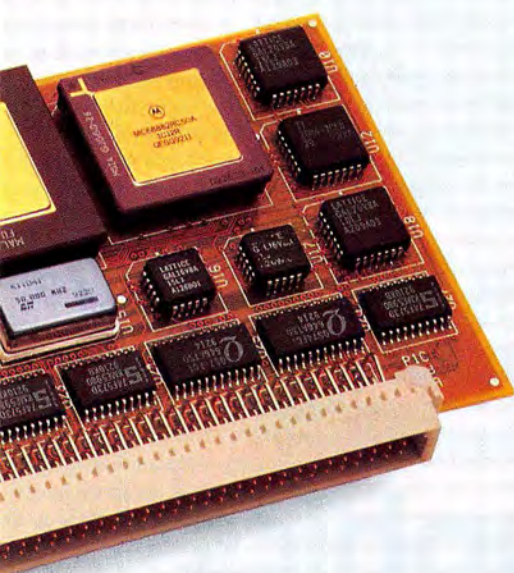
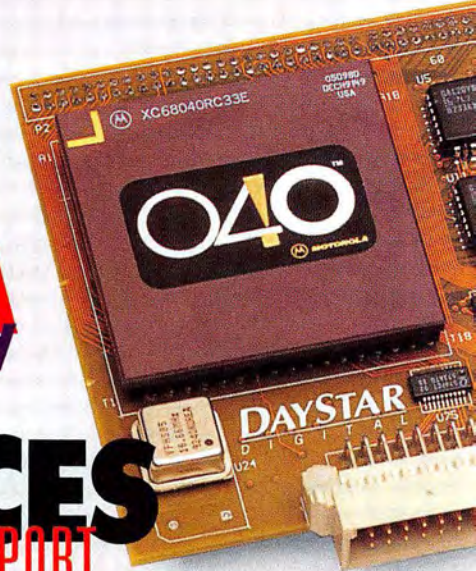
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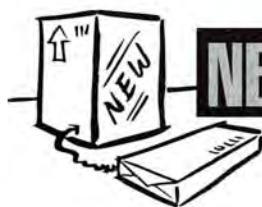
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NEW ON THE MENU

Not so long ago, Apple really believed, in comedian Harry Anderson's words, that we "didn't need color, slots, or big screens." Times change. Color will be one of Apple's big drives for 1993, and Apple's first step is a complete color-in/color-out system.

The **Apple Color OneScanner** (\$1,349) is the color-input device from Apple (408-996-1010).

Successor to the original OneScanner, which stays in the line for gray-scale-only scanning, the Color OneScanner includes several hardware innovations that focus on image sharpness and color accuracy and includes a color version of Ofoto.

Starting with the lens, Apple designed custom optics that are optimized for the sharpest image and fewest color aberrations. To remove whatever color errors do occur, Apple incorporated a color-correcting ASIC (application-specific integrated circuit) that corrects any color problems on the fly. Stepper-motor vibration can degrade both the image's focus and its color registration, so Apple's design reduces vibration. And to capture an image's full dynamic range, Apple incorporated an adaptive analog/digital converter that automatically sets the white and black points of each image, yielding a maximum of 256 gradients per hue.

The final hardware improvement was to the CCD (charge-coupled device). The Color OneScanner uses a single-pass, Tri-linear CCD array, in which separate CCD strips are assigned to each of the red, green, and blue channels, with built-in filters on

each strip. The single-pass Tri-Linear approach means less vibration and better color registration.

For color output, Apple has produced its first color printer, the **Apple Color Printer** (\$2,349). Although it's an important first step, the product is about as feature-deep as its name. Equipped with the same Canon bubblejet engine as the Lexmark Jetprinter PS 4079, the Color Printer is a four-color,

360-dpi inkjet printer that can print on pages as large as tabloid-sized but that offers no PostScript or networking options. The printer is a direct-connect, QuickDraw device only, so it has no memory or processor: All the smarts are left to the host Mac. (You can share it by using Apple's new GrayShare technology,

however. For more on GrayShare, see "Gray Masters," in this issue.)

To keep all of its colors in line, Apple has also issued its color-management system, ColorSync (for more on ColorSync, see "Getting Color in Sync," in this issue). Watch for more color news from Apple as the year progresses. Now, about those slots . . .

Up to Date . . .

Retrospect 2.0, Dantz Development's popular archiving and backup software, now sports a vastly improved interface and better scripting capabilities. 510-849-0293. \$249. ● **SuperDisk! 2.0**, Alysis Software's compression package, combines SuperDisk with Alysis' More Disk Space background compressor. 415-566-2263. \$119.95. Ⓜ



By Russell Ito



Apple's new Adjustable Keyboard and Apple Desktop Bus Mouse II feature ergonomic designs intended to reduce the chances of repetitive-stress injury.

Apple Goes Ergonomic

The keyboard may have replaced the bathtub as the site of the most-frequent injuries. With repetitive-stress injuries and carpal-tunnel syndrome increasingly being recognized as serious health threats, Apple has introduced an adjustable keyboard and a new mouse.

Although inventors such as Tony Hodges have demonstrated prototype split keyboards before, Apple is the first major computer manufacturer to build one. The Apple Adjustable Keyboard is split down the middle, enabling you to adjust the halves outward as much as 30 degrees. The design is intended to reduce wrist strain by bringing your hands more in line with your arms. The keyboard's space bar is extra large, so it's easy to use from either half of the keyboard. Apple has enlarged several other keys as well, including Tab and Caps Lock. Detachable wrist rests are also included, as is a separate numeric keypad with the full allotment of 15 function keys, cursor keys, the standard 6 screen-navigation keys, and 4

keys for audio work (record and volume up/down/mute). The keypad comes with its own wrist rest and short ADB cable for connection to the keyboard. The Adjustable Keyboard's list price is only \$34 more than that of Apple's regular Extended Keyboard.

The Apple Desktop Bus Mouse II is a more rounded version of the current model, with a large, single button that occupies about the front third of the mouse. Apple has reduced the amount of pressure needed to click the button and has repositioned the ball to the front of the mouse for easier mousing and better control. The ADB Mouse II will replace the current model early this year and will be available separately.

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010. Adjustable Keyboard, \$219; Apple Desktop Bus Mouse II, \$79.

Plain-Paper Color

With the exception of ink-jet printers, plain-paper color printing really hasn't taken off yet — most color printers still require special paper.

Tektronix's new Phaser family of thermal-wax printers may change all that.

The Phaser 200i and 200e are the first printers to use a new printing technology that, prior to printing, actually lays down a special primer coat precisely where the printing will take place. The primer smoothes the paper, making it possible to get clear, vibrant colors on plain paper.

Both printers are 300-dpi, Adobe PostScript Level 2 models with print rates of 2 ppm (pages per minute). The Phasers' speed is a major development; most previous thermal-wax printers print only about 1 ppm. Both Phaser models come with parallel, serial, and LocalTalk ports, and the 200i offers an EtherTalk option.

The major difference between the printers is in their processors and memory configurations. The 200e comes standard with a 16-megahertz Advanced Micro Devices 29000 RISC chip and 4 megabytes of RAM (expandable to 8 megabytes); the 200i uses a 24-megahertz AMD 29000 RISC chip and comes with 6 megabytes (expandable to 14 megabytes). Tektronix predicts that the 200i's faster processor will boost the printer's imaging speed by about 50 percent over the 200e's speed. The 200i also includes a SCSI

port and comes with 39 Adobe fonts; the 200e ships with 17 Adobe fonts, with an additional 22 available on an optional font SIMM.

Tektronix, Inc., P.O. Box 1000, MS 63-583, Wilsonville, OR 97070; 800-835-6100 or 503-682-7377. 200e, \$3,695; 200i, \$5,995.

Precision-Color Pivot

Radius' newest monitor, the PrecisionColor Pivot, is the first Pivot monitor to offer 15-inch full-page and landscape capabilities for both Macintoshes and PCs in a single unit.

The PrecisionColor Pivot can display resolutions of 640 x 480, 832 x 624 (Apple 16-inch), 864 x 640, and 1,024 x 768 pixels (landscape only), depending on the video card installed. The PrecisionColor Pivot supports Quadra internal video to a maximum pixel depth of 24 bits (16.7 million colors), with pivoting.

In addition to its other features, the PrecisionColor is the first Pivot to include an anti-glare treatment on the monitor lens. An antistatic coating that reduces the amount of dust attracted to the monitor lens has also been applied.

At a suggested list price of only \$1,149, the newest Pivot



The Radius PrecisionColor Pivot offers Mac and PC users a pivoting monitor and multiple resolutions in the same unit.

monitor should see a street price of \$900 or less.

Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; 408-434-1010. \$1,149.

More In Control

When In Control appeared late in 1991, it proved to be a promising, flexible to-do-list manager. A year later, Attain has added several features that strengthen the product considerably.

The most notable addition is an integrated calendar, which appears along the bottom of the In Control window. You can arrange your to-do items simply by dragging them from the list view onto a specific date on the calendar.

To help further manage your items, version 2.0 includes check boxes for completed tasks and lets you hide or show the checked items. Also new in version 2.0 is a simple scripting function, similar to that in FileMaker Pro, that lets you automate repetitive tasks such as sorting, formatting, and matching. You can set the program's new Auto-Script function to automatically execute a specific script every time you launch In Control.

In Control 2.0 also includes a document-linking function that lets you link a document or application to a to-do item and then conveniently launch that file or program directly from within In Control.

Attain Corporation, 48 Grove Street, Somerville, MA 02144; 617-776-1110. \$129.95.



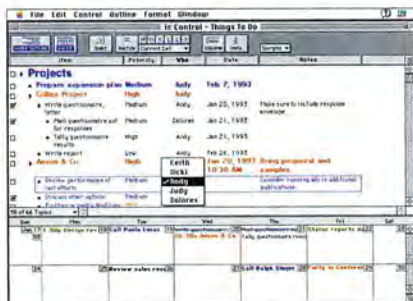
Imagine: A scanner inside your computer! The Nikon CoolScan slide scanner is small enough and light enough to fit into a half-height drive bay.

Nikon's Cool Scanner

Imagine the convenience of having a scanner built in to your Mac. Need an image? Easy. Just load a slide into the carrier, insert the carrier into the slot on the front of the Mac — just as if you were loading a CD-ROM — and bingo! That's the idea behind Nikon's new CoolScan slide scanner.

The scanner, which has a patented LED illumination system, consumes very little energy and gives off very little heat (thus the cool name). The CoolScan unit is small enough to fit into a half-height drive bay and weighs less than 2 pounds. The 24-bit scanner can complete an average 35mm-transparency or negative scan in 100 seconds. An external version of the CoolScan is also available.

Nikon Electronic Imaging, 1300 Walt Whitman Road, Melville NY 11747; 516-547-4355. Less than \$2,200.



In Control 2.0 adds a calendar to its to-do lists, enabling you to manage your time more effectively. This version also includes a simple scripting function.

NewsLine

Reports and Analysis

Apple to Team with Novell?

CUPERTINO, CA — The hottest rumor to sweep through Silicon Valley in months had Apple Computer set to merge with networking giant Novell. Although Apple sources declined to comment and Novell flatly denied the rumor, a financial analyst with contacts at both companies confirmed to the *San Jose Mercury News* early in December that Apple CEO John Sculley and Novell president Ray Noorda had been conducting secret meetings for several weeks. Industry analysts doubt that the companies will merge; a technology-sharing agreement — similar to the agreements Apple has signed with IBM — is deemed more likely. Such an alliance would bolster both firms against the threat from Microsoft's upcoming Windows NT.

Apple Picks America Online

CUPERTINO, CA — Apple and America Online have signed an agreement that will let Apple use technologies developed by America Online in Apple's future on-line services. The two companies will also work together to develop enhancements to the America Online system. Under the agreement, Apple will enjoy a nonexclusive license to use America Online's services for Apple-brand on-line services. In exchange, America Online will receive a usage-based royalty. Apple's on-line division announced that it plans to use America Online technology in future versions of AppleLink.

VPL Virtually Gone

FOSTER CITY, CA — VPL Research, the company that pioneered the concept of virtual reality, has lost control of its patents to its French venture-capital partner, Thomson CSF, which has assumed control of VPL. The patents had been used as collateral for a \$1 million loan on which VPL subsequently defaulted. VPL founder Jaron Lanier and other former officers have vowed to start a new firm, but no details have been announced.

Borland Lays Off 350

SCOTTS VALLEY, CA — In a sign of the severity of the database wars, Borland International laid off 350 people — 15 percent of its work force — in early December. The move was attributed to Microsoft's aggressive pricing strategy for Access, the first Microsoft database program for Windows. Following a marketing strategy Borland itself used against Lotus, Microsoft offered Access at an introductory price of only \$99 — hundreds of dollars less than the \$500 to \$700 normally charged for database programs. Meanwhile, Borland's Windows version of its successful DOS database program, Paradox, was considerably behind schedule; the company was expecting to ship that version in January 1993 instead of the originally projected fourth quarter of 1992.

Central Point Lays Off 10 Percent

BEAVERTON, OR — As part of a major corporate restructuring, Central Point Software announced its plans to lay off approximately 10 percent of its 424-person work force. The move was part of a complete product-marketing and product-development restructuring that came about following a disappointing 1992 fiscal year, which forced the postponement of the company's first public stock offering, scheduled for last June.

If an Eddy it's got

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Products preceded by **●** are **System 7** compatible. For *specific features* of System 7.1, please ask your salesperson when placing your order. Also, our new **System 7.1 Video** w/Don Crabb, is just \$9 (2244) or *free* when you order Apple's System 7.1 for \$79 (1074).

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- Asanté Technologies, Inc.**
- EN/SC-BNC or 10/T for PBooks... ea. 339.
- Battery Technology, Inc.**
- 7562 Battery for PowerBook 140-170 62.
- Computer Care**
- 4153 BookView Imperial 140-170 999.
- 4162 BookRAM 4S 329. 4161 BookRAM 6S 475.
- ★ **Dayna ... 60 day MBG**
- 5396 DaynaPORT SCSI Link PB (BNC) 299.
- 5360 DaynaPORT SCSI Link PB (10-BASE-T) 299.
- 5484 DaynaPORT SCSI Link-3 PB 349.
- Envisio, Inc.**
- 2411 ColorBook 16 (2 MB) 729.
- 2380 (4 MB) 945. 2268 (6 MB) 1089.
- FWB, Inc.**
- 5567 hammerPB80 ... 719. 5568 PB120... 799.
- ★ **Global Village ... 30 day MBG**
- 7720 ●PowerPort/Silver 369. 7710 /Gold 429.



- ★ **Applied Engineering ... 30 day MBG**
- 8799 PowerBook Auto Adapter—Get power for your PowerBook from your car's cigarette lighter \$69.
- 8800 PowerBook Battery Charger—Fully discharges your PowerBook battery before recharging it for better efficiency..... 139.



Get on board! Thousands of Macintosh products to choose from, all at terrific savings. Check out the latest releases, the newest versions, and special bundles.

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- ★ **I/O Design Cases ... 30 day MBG**
- 8121 PowerBook SL 59. 8113 PowerBook EX 65.
- ★ **Kensington ... 30 day MBG**
- 9585 Executive PowerBook Case 125.
- 1118 Compact PB Case.. 45. 1092 Deluxe.. 79.
- 5976 NoteBook Keypad 95.
- MASS Microsystems**
- 6313 1" Portable Drive Granite Case (120 MB) 599.
- 2220 MASSfm 24/96 PB 189.
- NEC**
- 6577 CDR37 Portable CD-ROM Drive 439.
- Palomar Software**
- 9576 ●On The Road 62.
- PowerBook Cables (various)**
- PowerBook Memory Modules**
- 2 MB, 4 MB, & 6MB modules available
- ★ **PSI Integration, Inc. ... 30 day MBG**
- 5320 ●PowerModem 155. 6961 ●Pow.Mod. II. 235.
- 7798 ●PowerModem III. 329. 7786 ●IV .. 425.
- Sigma Designs**
- 6939 Power Portrait (granite case)..... 679.
- ★ **Sophisticated Circuits ... 30 day MBG**
- 7425 PowerPad... 79. 7419 w/QuickKeys. 119.
- ★ **Symantec ... 30 day MBG**
- 1199 ●Norton Essentials for PowerBook..... 87.
- ★ **Targus ... 60 day MBG**
- 1305 Universal Notebook 69.
- 6037 Premier Leather Case 169.
- ★ **Utilitron, Inc. ... 30 day MBG**
- 3012 ●PowerSwap 25.

DAILY BUSINESS ACCOUNTING, DATABASES, SPREADSHEETS, WORD PROCESSING

- A Lasting Impression**
- ResumExpert or Cover Letters..... ea. 48.
- ★ **Aatrix Software ... 30 day MBG**
- 8914 ●PayCheck 49. 8079 ●Hil Finance 79.
- Abacus Concepts**
- 7106 ●StatView 4 439.
- ★ **Acius ... 30 day MBG**
- 5618 ●4th Dimension 3.0..... 575.
- ★ **Advanced Software ... 30 day MBG**
- 8051 ●Intouch 2.0 55. 9049 ●DocuComp II 99.
- ★ **After Hours Software ... 30 day MBG**
- 1352 ●TouchBASE 75. 3314 DateBook 75.
- 7411 ●TouchBASE & DateBook Bundle..... 95.
- 1977 ●TouchBASE/After Dark/Quicken Bundle 89.
- Amaze, Inc.**
- 3582 ●The Far Side Daily Planner 2.0 49.
- 9105 ●Trivial Pursuit Sports Edition 49.
- ★ **Attain Corporation ... 60 day MBG**
- 8465 ●IN CONTROL 85.

- ★ **Avery ... 60 day MBG**
- 7446 ●MacLabel Pro 1.5 48.
- ★ **Banner Blue ... 30 day MBG**
- 3548 ●Org Plus For Macintosh 1.0..... 125.
- ★ **Baseline Publishing ... 30 day MBG**
- 8881 ●Thunder 7 1.5 55.
- Beagle Brothers**
- 3119 ●BeagleWorks..... limited time special 69.
- Broderbund Software**
- 3608 ●MacUSA ... 29. 3356 ●MacGlobe ... 34.
- ★ **Chena Software ... 30 day MBG**
- 1594 ●Fair Witness 1.2..... 185.
- ★ **Chipsoft ... 30 day MBG**
- 8059 ●MacInTax Final Version 10.1 49.
- MacInTax State Tax Packages..... ea. 35.
- 3916 ●MacInTax & Quicken Bundle 59.
- ★ **Clarix ... 30 day MBG**
- 1129 ●MacWrite II 89. 1745 ●MacProj Pro 399.
- 3903 ●ClarixWorks 1.0V3..... 199.
- 5351 ●Clarix Resolve 1.1 125.
- 3836 ●FileMaker Pro 2.0 268.
- 4752 ●FileMaker Pro 2.0 Upgrade 89.
- Contact Software**
- 7636 ●ACT! 249. 10317 ●ACT! Comp. Upgrd. 91.
- ★ **Dow Jones ... 30 day MBG**
- 1786 ●Market Manager Plus 2.03 189.
- 1942 ●Market Analyzer Plus 2.04..... 225.
- ★ **Expert Software ... 30 day MBG**
- 5234 ●Expert Writer 1.0..... 29.

ATTAIN

IN CONTROL

To-Do List Manager.

FROM THE ORIGINAL CREATORS OF FILEMAKER

★ **Attain Corporation ... 60 day MBG**

8465 ●IN CONTROL—1992 MacUser's Editors' Choice Award Finalist for *Best Organizational Tool*. Top-rated To-Do List Manager. Display & manage your activities as outlines, prioritized lists, & calendars! **\$85.**

it's new and it's hot.



★ ChipSoft ... 30 day MBG

8059 **MacInTax Final Version 10.1**—Over 90 forms, schedules & worksheets, & Easy Step, a revolutionary new tax preparation system that leads you through your return. \$5 mfg. rebate, \$10 rebate if purchased with state pkg. ... **\$49.**

★ ExperVision ... 30 day MBG

7486 **TypeReader** 499.

★ Helix Technologies ... 30 day MBG

1077 **Helix Express** 299.

★ Intuit ... 30 day MBG

2507 **Quicken 3.0** 42.

★ JAM Software ... 30 day MBG

6089 **Smart Alarms Plus 3.1** 45.

1153 **Smart Schedules** 199.

★ Lotus Development ... 30 day MBG

3606 **1-2-3 Mac 1.1** 289.

3604 **1-2-3 Mac 1.1 Upgrade** 99.

★ MECA ... 60 day MBG

2796 **Managing Your Money 5.0** 32.

3004 **Tax Cut '92** 44.

★ Microlytics ... 60 day MBG

6461 **WordFinder Plus 4.02** 39.

7820 **Random House Encyclopedia 1.0** 68.

★ Microsoft ... 30 day MBG

2884 **Works 3.0** 155. 8173 **Upgrade** 79.

3669 **Excel 4.0** 295. 5237 **Upgrade** 125.



★ Microsoft ... 30 day MBG

3669 **Excel 4.0**—1992 MacUser's Editors' Choice Award Finalist for Best Business Productivity Product. With features like Autofill and Best Fit, this powerful spreadsheet becomes the logical business solution **\$295.**

4902 **Word 5.1** \$295. 1503 **Upgrade** \$125.
5454 **The Microsoft Office 3.0** 475.

★ Niles & Associates ... 30 day MBG

4602 **EndNote 1.5.1** 85. 8010 **Plus 1.2.1** 142.

Nisus Software

5683 **Nisus 3.06** 238. 1612 **Compact 3.3** 92.

★ Nolo Press ... 30 day MBG

4228 **Personal RecordKeeper 3.0** 29.

2981 **WillMaker 4.0** (not valid in LA.) 35.

1204 **Living Trust 1.0** (not valid in LA.) 43.

★ Palo Alto Software ... 60 day MBG

10339 **Business Management Toolkit** 75.

6975 **Business Plan Toolkit 4.0** 75.

★ Pastel Development ... 30 day MBG

1785 **DayMaker 2.0** 79.

★ Peachtree ... 60 day MBG

9584 **Accounting for Macintosh 2.0** 75.

9588 **Insight Accounting 4.0** 299.

★ Portfolio Systems ... 30 day MBG

7992 **DynoPage 1.7** or 6916 **Dynodex** ea. 49.

★ Power Up ... 30 day MBG

7696 **Calendar Creator** 48.

7694 **Address Book Plus** 67.

1760 **PowerRunner Bundle** 95.

★ ProVUE ... 60 day MBG

4582 **Panorama II 2.0.6** 239.

★ Reality Technologies ... 30 day MBG

6929 **WealthBuilder 2.0** 94.

★ Reference Software ... 30 day MBG

6268 **Grammatik 5 Mac 1.0** 44.

9587 **Webster's Dictionary & Thesaurus 1.0** 44.

Round Lake Publishing

LetterWorks, SALES or LEGAL ea. 45.

★ Shana Corporation ... 30 day MBG

7692 **Informed Designer 149**. 8810 **In. Mgr.** 99.

★ Softsync, Inc. ... 30 day MBG

7129 **Accountant, Inc. 335**. 3828 **MultiUser** 679.

★ Symantec ... 30 day MBG

3422 **More 3.1** 265.

★ SYSTAT ... 30 day MBG

1230 **FASTAT** 399. 1231 **SYSTAT** 699.

★ Technology Works ... 30 day MBG

7736 **Spiral 1.0** 79.

★ Teleware ... 30 day MBG

7616 **M.Y.O.B. 3.0** 138. 9239 **Upgrade** 59.

★ TIMESLIPS ... 30 day MBG

1701 **LapTrack 52**. 2986 **Timeslips III** 194.

★ T/Maker ... 30 day MBG

1858 **FaxMania (birthdays to bulletins)** 25.

7709 **WriteNow Workshop Compet. Upgrd.** 99.

7664 **WriteNow Workshop Bundle** 139.

★ Vertical Solutions ... 60 day MBG

5886 **FastLabel 55**. 3235 **MacLabelPak** 85.

★ WordPerfect ... 60 day MBG

9579 **LetterPerfect 2.1** 89.

3800 **WordPerfect 2.1.2** 279. 4711 **Upgrd.** 75.

★ Wordstar ... 30 day MBG

6984 **Correct Grammar 3.01** 49.

3554 **American Heritage Dictionary 1.0** 55.

10277 **The Correct Bundle (4 programs!)** 99.

GRAPHICS & DESIGN PUBLISHING, PRESENTATIONS

★ Abracadata, Ltd. ... 30 day MBG

9990 **Design Your Own Home - Architecture**,
9992 **Interiors or 9994 Landscape** ea. 48.

Adobe Systems

10167 **Adobe Dimensions** 93.

5750 **Adobe TypeSet Classic Pack** 59.

10289 **SuperATM** 89. 10423 **Upgrade** 49.



Hewlett-Packard

8368 **LaserJet 4 (with toner)**—1992 MacUser's Editors' Choice Award Finalist for Best Monochrome Printer. True 600 x 600 dpi resolution, Adobe PostScript Level 2, 6 MB memory, etc. **\$2249.**

★ Adobe Type Library (Vol. 1-330) call

6957 **Adobe Type Reunion 1.0.3** 41.

6053 **Plus Pack 2.0** 118. 6098 **TypeAlign** 61.

4145 **Adobe Premiere 429**. 3199 **Upgrad.** 149.

8171 **Adobe Illustrator 3.2 (w/Dimensions)** 368.

5001 **Streamline 119**. 6644 **Photoshop** 548.

AGFA

7971 **AgfaType CD-ROM** 69.

★ Aldus ... 30 day MBG

6674 **Aldus Personal Press 2.0** 99.

2461 **Aldus Gallery Effects 1.01** 128.

10176 **Fetch** 199. 7541 **IntelliDraw** 194.

3506 **SuperPaint 135**. 4751 **Persuasion** 325.

1330 **FreeHand 394**. 7088 **PageMaker** 494.

Altsys

1983 **EPS Exchange 2.0** 89.

1195 **Fontographer 3.5** 258.

★ Apple Computer ... 30 day MBG

3008 **Apple Font Pack** 79.

★ Ares Software ... 30 day MBG

8878 **FontMonger 1.5 (Jan. '93)** 93.



★ Apple Computer ... 30 day MBG

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- Broderbund Software**
- 3572 **Kid Pix 1.2** 34. 7293 **Companion** 23.
 - 1427 **Print Shop**..... 35.
 - 6281 **TypeStyler 2.1 (with ATM)**..... 126.
 - ★ **Claris ... 30 day MBG**
 - 2518 **MacDraw Pro 1.5**..... 275.
 - 8007 **Claris CAD 2.0** 599. 6943 **Upgrade** 79.
 - ColorAge (formerly Custom Applications)**
 - 8037 **Freedom of Press Light 3.03 (17 fonts)** 84.
 - Computer Associates**
 - 1668 **Cricket Graph III**..... 119.
 - ★ **DeltaPoint ... 60 day MBG**
 - 3558 **DeltaGraph Professional 2.0**..... 199.
 - ★ **Deneba Software ... 30 day MBG**
 - 3227 **Canvas 3.0.4**..... 259.
 - ★ **Expert Software ... 30 day MBG**
 - 4870 **Expert Color Paint, 1737 Landscape, 8619 Home, or 1731 Office Design** ea. 29.
 - Fractal Design**
 - 1068 **Sketcher 1.0**..... 93.
 - 10402 **Painter 2.0**..... 265.
 - Gryphon**
 - 4202 **Morph 1.1**..... 95.
 - ★ **Letraset ... 30 day MBG**
 - 4709 **LetraStudio** 139. 6300 **FontStudio** 359.
 - Light Source**
 - 3733 **Ofoto 1.1.1**..... 275.
 - ★ **Linguist's Software ... 60 day MBG**
 - 2569 **Cyrillic II** 99. 2641 **Laser Hebrew** 89.



★Central Point Software ... 30 day MBG
5041 **MacTools 2.0**—1992 MacUser's Editors' Choice Award Finalist for Best Protection Program. New Version offers auto backup, data recovery & virus protection. MacWEEK, Macworld & MacUser claim it is a blockbuster product \$105.

- Macromedia**
- 7651 **Action! Mac** \$349. 7441 **SwivelPro** \$479.
 - 3450 **SwivelMan** 596. 7653 **MacroModel** 999.
 - ★ **Manhattan Graphics ... 30 day MBG**
 - 4990 **Ready, Set, Go!**..... 219.
 - ★ **Microsoft ... 30 day MBG**
 - 2878 **PowerPoint 3.0** 295. Upgrades call
 - 2565 **Project 3.0**..... 445. Upgrades call
 - Postcraft International**
 - 2210 **Effects Specialist 2.0**..... 89.
 - Quark**
 - 7612 **QuarkXPress 3.2 (Jan '93)**..... 549.
 - ★ **Specular International ... 30 day MBG**
 - 4962 **Infini-D 2.0**..... 699.
 - ★ **Synergy Software ... 30 day MBG**
 - 6617 **KaleidaGraph 2.1.3**..... 149.
 - ★ **Timeworks ... 30 day MBG**
 - 7115 **Publish It! Easy** 109. 7409 **ColorIt!** 165.
 - ★ **T/Maker ... 30 day MBG**
 - ClickArt (bitmapped)** 38. or (EPS).... 82.
 - ★ **Virtus Corporation ... 30 day MBG**
 - 4488 **WalkThrough 1.1**..... 309.



★Manhattan Graphics ... 30 day MBG
4990 **Ready, Set, Go!**—Offers powerful tools for all phases of the publishing process: an electronic paste board; customizable grids; text rotation; kerning; text-wrap; style sheets and glossaries; & advanced graphics tools .. \$219.

PROGRAMMING UTILITIES, HYPERCARD, SECURITY

- ★ **Abbott Systems ... 30 day MBG**
- 2515 **Calc+ 1.0** 36. 5236 **CanOpener 2.0** 309.
- ★ **Aladdin Systems ... 30 day MBG**
- 7410 **StuffIt Space Saver** 34. 6740 **Deluxe 3.3** 65.
- ★ **ALSoft ... 30 day MBG**
- 9808 **MasterJuggler** 25. 9807 **DiskExpress II** 45.
- 5204 **ALSoft Power Utilities 1.0.2**..... 62.
- ★ **Alysis Software ... 30 day MBG**
- 2687 **SuperDisk!** 66. 1608 **More Disk Space** 56.
- ★ **Apple Computer ... 30 day MBG**
- 1206 **At Ease 1.0**..... 49.
- 1074 **System 7.1** 79. 3413 **MultiPack**... 349.
- 7072 **QuickTime Starter Kit 1.5**..... 149.
- ★ **ASD Software ... 30 day MBG**
- 7085 **FileGuard 2.7.4 (1 user)**..... 138.
- ★ **Atticus Software ... 60 day MBG**
- 9120 **Super 7 Utilities**..... 64.
- ★ **Berkeley Systems ... 30 day MBG**
- 5737 **After Dark 2.0w.** 28. 2196 **Bundle.** 39.
- 7987 **Art of Darkness Book (Peachpit Press)** 16.
- 3392 **Star Trek: The Screen Saver**..... 34.
- ★ **Casa Blanca Works ... 30 day MBG**
- 1593 **Drive 7 2.3**..... 49.
- ★ **CE Software ... 60 day MBG**
- 1727 **CalendarMaker** 31. 8024 **QuickKeys2.** 89.
- ★ **Central Point ... 30 day MBG**
- 5041 **MacTools 2.0**..... 105.



★Aladdin Systems ... 30 day MBG
6740 **StuffIt Deluxe 3.3**—1992 MacUser's Editors' Choice Award Finalist for Best Compression Product. Solves all your needs from archiving to transparent compression \$65.
7410 **StuffIt SpaceSaver 1.0**..... 34.

- ★ **Claris ... 30 day MBG**
- 8734 **HyperCard Development Kit 2.1**..... 139.
- ★ **Connectix ... 30 day MBG**
- 8441 **CPU (Connectix PowerBook Utilities)**... 49.
- Coral Research**
- 7310 **TimeLog**.... 62. 7309 (10 Pack)..... 399.
- ★ **Dantz Development ... 30 day MBG**
- 9115 **DiskFit Direct 1.0**.... 29. 3393 **Pro.** 72.
- 5255 **Retrospect** 147. 7945 **Remote 1.3** 264.
- ★ **Datawatch ... 30 day MBG**
- 4803 **Virex/Mac or 8561 911 Utilities**..... 62.
- ★ **Fifth Generation ... 30 day MBG**
- 4287 **PYRO! 4.01** 27. 3955 **Suitcase 2.1** 53.
- 8286 **SuperLaserSpool 3.0**..... 99.
- 7404 **DiskDoubler** 52. 4838 **AutoDoubler**.. 58.
- 10398 **CopyDoubler 1.0**..... 39.
- FWB, Inc.**
- 7929 **Hard Disk ToolKit Personal Edition**.... 49.
- 2999 **Hard Disk ToolKit 1.1.1**..... 125.
- ICOM Simulations**
- 6296 **Intermission**.. 27. 3731 **OnCue II**.. 63.
- ★ **Inline Design ... 30 day MBG**
- 1744 **Icon 7**.... 31. 9843 **Inline Sync 1.0** 79.
- 7068 **INITPicker 3.0**..... 49.
- 2913 **Redux 1.63**.... 49. 1740 **Deluxe**.... 92.
- Insignia Solutions**
- 7552 **RapidTrak**..... 58.
- ★ **Kent Marsh Ltd. ... 30 day MBG**
- 9513 **FolderBolt 1.02**..... 71.
- 1839 **NightWatch II**..... 89.
- ★ **KyZen Corporation ... 30 day MBG**
- 10173 **UP Diff 1.0**..... 125.
- ★ **Leader Technologies ... 30 day MBG**
- 10272 **PowerMerge**..... 79.
- ★ **Logical Solutions ... 30 day MBG**
- 10169 **7th Heaven 2.5**..... 67.
- ★ **MAXA Corporation ... 30 day MBG**
- 8692 **Snooper HW & SW Kit**..... special 115.
- 8694 **Snooper (software only)**..... special 89.
- MicroMat Computer Systems**
- 3732 **MEK II 2.0.5**..... 89.
- ★ **Nine to Five Software ... 30 day MBG**
- 2020 **9 to 5 Office** 19. 9767 **Reports 2.5** 125.
- ★ **Now Software ... 30 day MBG**
- 1793 **Now Up-To-Date**.... 65. 2366 (10) . 519.
- 6925 **Now Utilities 4.0**.... 95. 8471 (10) . 775.
- Palomar Software**
- 8210 **PLOTTERgeist 2.1**..... 249.
- Pluma, Inc.**
- 8704 **Cause or 8713 Net Effect**..... ea. 185.
- ★ **Symantec ... 30 day MBG**
- 5176 **AntiVirus for Mac (SAM) 3.5**..... 64.
- 10312 **AntiVirus for Mac 3.5 (SAM) Upgrade** 24.
- 6748 **Norton Utilities for Mac 2.0**..... 95.

the pick of the lot.



FolderBolt
NightWatch II

★ **Kent Marsh Ltd.** ... 30 day MBG
The perfect combination of hard disk & folder security. Rigorous protection at its friendliest. Perfect for single users or site licenses.

9513 7 FolderBolt 1.02 \$71.
1839 7 NightWatch II 89.

9957	7 THINK Reference 1.0	68.
3421	7 THINK Pascal	165.
2688	7 THINK C	199.
Teknosys		
5203	7 Help!	88.
★ TGS Systems ... 60 day MBG		
6667	7 Prograph 2.5	299.
★ Thought I Could ... 30 day MBG		
4843	7 Wallpaper 1.0.2	37.
UserLand Software		
4753	7 Frontier 2.0	185.

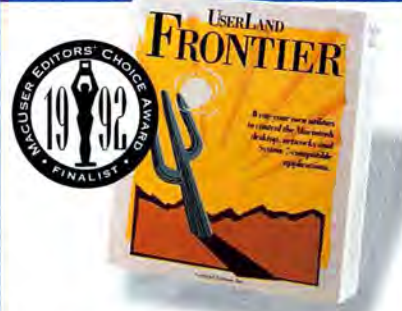
LEARN & PLAY FOREIGN LANGUAGES, TRAINING, GAMES

★ Abbott Systems ... 30 day MBG		
9578	7 Kaleidoscope	25.
Activision		
1039	7 Shanghai II	29.
1134	7 Lost Treasures of Infocom Vol. I.	40.
2470	7 Lost Treasures of Infocom Vol. II.	29.



MicroMat Computer Systems
3732 7 MacEKG II 2.0.5—1992 MacUser's Editors' Choice Award Finalist for Best Protection Program. Provides in-depth knowledge on what makes your Mac tick. Able to isolate/diagnose intermittent failures \$89.

★ AMTEX Corporation ... 30 day MBG	
2517	7 TRISTAN Pinball \$33.
★ Baseline Publishing ... 30 day MBG	
7785	7 Talking Moose 4.0.2 22.
Broderbund Software	
9059	7 Arthur's Teacher Trouble 41.
6516	7 The Playroom 2.0 (CP) (color) 29.
	7 Carmen Sandiego Series (CP) ea. 29.
8285	7 Where/World Carmen Sandiego Deluxe 47.
3559	7 SimAnt or 5871 7 SimCity Supreme ea. 35.
8266	7 SimEarth 1.1 40.
1910	7 SimLife 41. 3307 7 A-Train 39.
Buena Vista Software	
1711	7 Heaven and Earth 34.
Bungie Software	
8585	7 Minotaur 1.01B 47.
★ Carina ... 30 day MBG	
7761	7 Voyager II, the Dynamic Sky Simulator 99.
★ Centron Software ... 30 day MBG	
5910	7 Crossword Creator 39.
8525	7 Casino Master 39. 8524 (Color) . 45.
Colorado Spectrum	
2554	7 Mouse Yoke (aircraft yoke adapter) 29.
★ Cyan ... 30 day MBG	
6320	7 Manhole 1.6 19.
★ Davidson & Associates ... 30 day MBG	
3922	7 Talking Spell It Plus 28.
2574	7 MathBlaster Plus or 7942 Kid Works 2 34.
Delta Tao Software	
2536	7 Spaceward Hol or 2439 7 Strategic Conq. 36.
EARTHQUEST	
8050	7 EARTHQUEST or 3118 7 Ecology 1.0 34.
★ Edmark Corporation ... 30 day MBG	
7155	7 Kid Desk 24. 7318 7 Millie's Math House 29.
Electronic Arts	
1907	7 PGA Golf 39. 2963 7 StarFlight II 39.
2805	7 PGA Golf Tournament Course 18.
★ Expert Software ... 30 day MBG	
6219	7 Expert Astronomer 1.0 29.
Graphic Simulations	
8083	7 Missions at Leyte Gulf (req. Hellcats) . 20.
4756	7 Hellcats Over the Pacific 1.0.3 38.
★ Great Wave ... 30 day MBG	
6693	7 KidsMath 2.0 or 2276 Kid's Time.. ea. 25.
4334	7 NumberMaze.. 25. 8527 7 (Color) .. 35.
1513	7 ReadingMaze (Color, ages 3-7) 35.
3471	7 DaisyQuest (Color, preschool) 35.
★ HyperGlot Software ... 30 day MBG	
	(French, German, Italian & Spanish)
	7 Word Torture ea. 32. 7 Tense Tutor ea. 38.
	7 Pronunciation Tutor
	(Span., Fren.) ea. 32. (Germ., Chin.) ea. 38.
★ Inline Design ... 30 day MBG	
1562	7 3 in Three... 31. 7652 7 Cogito 37.
1944	7 Swamp Gas 31. 1747 7 Europe 37.
7646	7 Tinies or 7650 S.C.OUT (Jan. '93) ea. 37.
8809	7 Tesserae 31. 3414 7 Mutant Beach. 37.
Innerprise	
1662	7 CyberBlast 25.
Interplay Productions	
1894	7 BattleChess (3D animation) 29.
1893	7 CheckMate (infinite play levels) 31.
★ Learning Company ... 30 day MBG	
2670	7 Reader Rabbit 3.0 (CP) (ages 4-7) 34.
9570	7 Reader Rabbit 2 1.0 (ages 5-8) 34.
3281	7 The Writing Center 1.0 51.
★ Leister Productions ... 30 day MBG	
7126	7 Reunion 3.0 115.
★ MECC ... 30 day MBG	
3963	7 Oregon Trail 1.1 28.
3960	7 Number or 3959 Word Munchers ea. 18.



UserLand Software
4753 7 Frontier 2.0—1992 MacUser's Editors' Choice Award Finalist for Best Development Tool. Power-user's scripting system for System 7. "Mac users have wanted something like this since 1984," (MacUser 12/91) \$185.

★ Microlytics ... 60 day MBG	
7871	7 Berlitz Interpreter 34.
MicroProse	
9520	7 Civilization: Sid Meier's 39.
★ Microsoft ... 30 day MBG	
2868	7 Flight Simulator 4.0 (CP) 42.
★ Nordic Software ... 30 day MBG	
8257	7 Preschool Pack - Color 2.0 34.
7470	7 Jungle Quest 30. 7537 7 Kolor Klips 37.
★ Penton Overseas ... 30 day MBG	
	7 VocabuLearn/ce Levels I & II (Span., Fren., Germ., Ital., Rus., Japan., & Heb.) ea. 35.
	7 VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.) ea. 35.
★ Personal Training Sys. ... 60 day MBG	
	Training for System 7, Excel, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, QuarkXPress, ClarisWorks & Mac. ea. 49.
	Pluma, Inc.
8695	7 Capitalist Pig 34.



Beagle Brothers
3119 7 BeagleWorks—Integrated word, spreadsheet, database, paint, communications & draw modules all in one package. Features include In-Context Editing, irregular text wrap, auto-sum tool, etc. Special limited offer only \$69.



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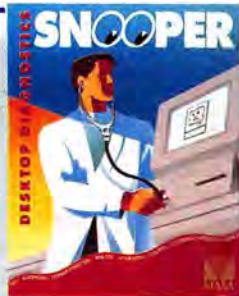


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OUTPUT DEVICES

HP LaserJet 4M

HP's 600-dpi output device sets a new standard for affordable laser printing.

What do 300-dpi laser printers have in common with dinosaurs? Check out the HP LaserJet 4M, and find out. This 600-dpi laser printer costs less than many 300-dpi printers. What's more, the 8-ppm (pages per minute) printer features resolution enhancement, PostScript Level 2 support, network printing capabilities, ease of use, and an attractive design. All in all, with competition such as the LaserJet 4M, it's hard to imagine why anyone would even bother with a 300-dpi laser printer nowadays.

Multilingual Printer

The HP LaserJet 4M is tailor-made for the Mac, but it also comes with software that allows it to connect to PCs running Windows or DOS. Installation and setup is fast and hassle-free. The 4M has three I/O ports. To connect the printer directly to your Mac, you use a standard DIN-8 connection, which is included. The printer also has a serial and a parallel port. LocalTalk is built in, but if you want to connect the printer to Ethernet, EtherTalk, or token-ring LANs (local-area networks), you will need to get one



HP LaserJet 4M

Manufactured by: Hewlett-Packard Co., P.O. Box 58059, MS511L-SJ, Santa Clara, CA 95051; 800-752-0900 or 408-725-8900.
List Price: \$2,999.

of HP's \$695 JetDirect cards.

The 4M features Hewlett-Packard's Resolution Enhancement Technology (RET), which is similar to the FinePrint technology in the Apple LaserWriter IIg and Okidata's Smoothing Technology. The printer comes with 35 built-in Type 1, 35 Intellifont, and 10 TrueType fonts, and it also accepts HP MasterType font cartridges.

The 4M is ideal for multiplatform computing environments, because with its ability to automatically switch among parallel, serial, and LocalTalk ports, you can connect PCs as well as Macs directly to the printer. Both the PostScript Level 2 and the HP-PCL 5 printer languages

are built in. The 4M senses the type of print job coming in and selects the correct printer language automatically. The 4M also gives you the option of printing at a 300-dpi setting for fast output of page proofs.

To test the cutting-edge technology of the HP printer, we put the 4M and an Apple LaserWriter IIg through a series of MacUser Labs tests and compared the results. To test the printer's ability to handle complex pages, we used a composite PageMaker test page that included a gray-scale image, type samples in a range of sizes from 8 to 24 points, vector graphics, and gray ramps for testing gradient-fill quality. A second test comprised a 50-page text document designed to validate the printer's ppm rating. For our tests, we used LocalTalk to network a Mac IIci equipped with 5 megabytes of RAM with a 4M printer equipped with its standard 6 megabytes of RAM (it can be expanded to 22 megabytes). We then networked the Mac to an Apple LaserWriter IIg equipped with 5 megabytes of RAM and with PhotoGrade and FinePrint activated.

Superior Output

The results from the PageMaker test were striking. The 4M stood out in every respect. Text was crisp and legible, even at small point sizes (8 and 9 points). Closely spaced characters were distinct and clear. By contrast, the IIg's small characters tended to blur and touch due to both the lower resolution (300 dpi) and the way in which the printer's toner scatters and blurs on the page. At the largest point sizes, the 4M's output displayed none of the jaggies that marred the IIg's output.

Even more impressive was the quality of the 4M's graphic output. The 4M produced far less banding on the gray ramps than the IIg did. In addition, the 4M's gray-scale images exhibited a higher degree of detail and were clearly superior to the IIg's. Vector-based images also showed fewer jaggies.



The 8-ppm HP LaserJet 4M delivers superior 600-dpi output at a price that undercuts those of many 300-dpi laser printers.

Both printers processed the composite page in approximately the same time (20 minutes and 21 seconds for the 4M versus 19 minutes and 50 seconds for the IIg); the 4M was a smidgen faster when we disabled RET. It's important to keep in mind that the 600-dpi 4M is processing much more data than does the 300-dpi IIg.

The 4M delivers impressive speed, thanks to its Intel 80960 KA 20-megahertz RISC processor. Most other laser printers don't use RISC processors. Speed results gleaned from our 50-page text document showed the 4M's actual output to be about 7 ppm and the IIg's to be about 6 ppm — well within the range of what's expected from printers rated at 8 ppm.

Versatile Paper Handling

The 4M's paper-handling abilities are flexible and well designed. The standard paper tray holds 250 sheets of paper. The paper-exit tray (located on top of the printer) also holds 250 sheets. When the tray is loaded and installed, the cartridge doesn't jut out from the printer, as is the case with most other laser printers; instead, the 4M's tray lines up with the front, making the printer compact and ideal for cramped office spaces. A paper-level indicator shows you at a glance whether you need to break open another realm of paper.

The 4M supports as many as four paper sources — the supplied 250-sheet tray; a built-in multipurpose feed for envelopes, heavy stock, and legal-sized paper; an optional \$349 500-sheet unit that sits under the printer; and an optional \$349 75-envelope feeder.

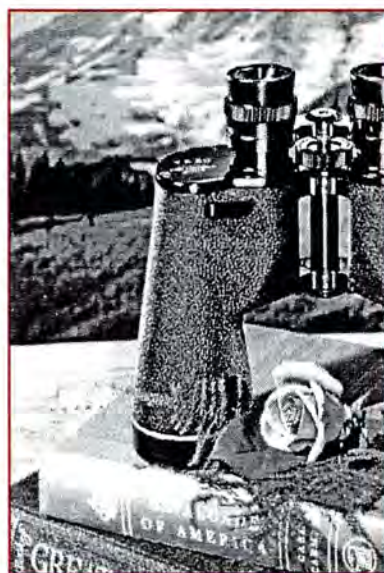
To select the paper source and other options, you use the standard Page Setup and Print dialog boxes in your application. An excellent panel for configuring the printer and paper trays graces the top of the device, but we never had to use it. You can control virtually every aspect of the 4M's workings through its software interface. You can even tell it to take the first page from one tray and all subsequent sheets from another. This ability comes in handy if you want to use special letterhead for the first page of a multipage document.

The 4M uses toner that's much finer than that used by most laser-printer toner cartridges, enabling it to produce its signature crisp letters and sharp graphics.

AaBbCcDd
AaBbCcDd
AaBbCcDd
AaBbCcDd

AaBbCcDd
AaBbCcDd
AaBbCcDd
AaBbCcDd

The text output from the 600-dpi LaserJet 4M (left) is crisper and clearer than that of the Apple LaserWriter IIg (right), even at small type sizes. The samples shown here have been enlarged by 200 percent.



Most impressive was the LaserJet 4M's graphics output (left). Clearly superior to the LaserWriter IIg's (right), the 4M's output is near photo quality.

Cartridge life is rated at 6,000 pages at 5-percent coverage.

Overall, we found the 4M's interface and construction a wonder to behold, but there is some room for improvement. The printer lacks a SCSI port, so you can't connect a hard drive for storing fonts and spooling print jobs, a feature most DTP professionals and service bureaus rely on. In addition, the printer's LED-display window has the irritating habit of almost always displaying the same message — it usually reads Ready, even when the printer is processing a job. A small, separate Ready light blinks during print jobs to clue you in, but the display window would be far more useful if it could show a Busy or Processing Job message.

The Bottom Line

With a price that undercuts that of many 300-dpi laser printers, the 600-dpi HP LaserJet 4M alters the playing field

for affordable high-quality laser printing. However, before you rush out to purchase this marvel, be aware that as we were going to press, Apple was putting the finishing touches on its own 600-dpi laser printer, the LaserWriter Pro 630. This printer, which will also be priced less than \$3,000, should be available by the time you read this. One major advantage Apple's offering will have over HP's is a built-in SCSI port for attaching a hard drive — it will let you spool print jobs and store fonts.

That said, the LaserJet 4M is an impressive printer that delivers outstanding output for a modest price. It also comes with Hewlett-Packard's deserved reputation for reliable products. The 4M is an excellent choice for DTP work, and, with a street price of less than \$2,000, the printer is well within the reach of individual users as well as workgroups. We highly recommend it.

— Gregory Wasson

IMAGE EDITING

Cachet

EFI's color-editing software helps novices achieve predictable image output.

Truly revolutionary applications are few and far between. Lotus 1-2-3, Adobe Photoshop, and Aldus PageMaker were all programs that defined whole new application categories for personal computers. Cachet, from Electronics for Imaging (EFI), is the latest addition to this software hall of fame. Cachet not only provides Mac users with predictable color-image output from a wide variety of printing presses and desktop color printers without the use of expensive monitor-calibration hardware but it also makes the arcane field of color correction accessible to average users.

Editing by Reference

To work its magic, Cachet teams proprietary color-management technology from EFI with a simple yet innovative concept — editing images by reference. The technology, called the EfiColor Color Management System, enables Cachet to deliver consistent color output to all supported output devices. By converting color data into reference-color values, EFI's system deals with color the way humans, rather than machines, perceive it. The system then uses device-profile files to convert reference-color values into values appropriate to specific output devices.

With Cachet's extensive library of color reference images, which come in both printed and electronic form, users can avoid the expense and hassle of using a hardware-based monitor-calibration system. To edit your image by reference, you first select an image from Cachet's library that uses lighting and subjects similar to those of the image you're editing. You then open it in Cachet and display it alongside your target image.

Using a nifty programming trick, Cachet lets you apply changes to the target image without affecting the reference image. Moreover, you adjust the target image to match the reference image as closely as possible rather than adjust the target image so that it looks good on-



Cachet 1.1

Published by: Electronics for Imaging, 2855 Campus Drive, San Mateo, CA 94403; 415-286-8600.

List Price: \$595.

screen. EfiColor takes care of matching the color values to your particular output device. Because you can see how the reference image looks when printed, you can predict how your own image will look. The beauty of this system is that it's extensible — once you've successfully corrected and printed images, you can add them to your reference-image library.

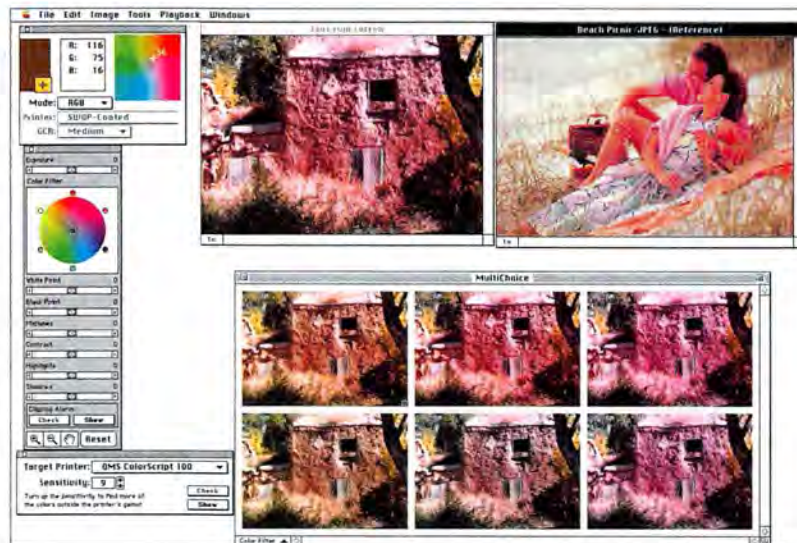
Exposure and Tone

Of course, you must also be able to compensate for any defects in images. Cachet's Exposure and Tone palette lets you adjust sliders for exposure, white point, black point, midtones, contrast,

highlight, and shadows as well as adjust the overall color by moving the color-filter point around a color-picker wheel. For inexperienced users, Cachet displays six miniature views of the target image with different settings already applied. You simply click on the one that best matches the reference image you've selected, and Cachet applies the changes. A pop-up menu takes you through the different adjustments in a sensible order, and usually you won't need to adjust all the parameters.

Cachet's Color palette lets you adjust the overall color cast, saturation, and lightness of an image. Again, novices can simply select the image that looks best from among a variety of miniatures.

The Selective Color palette is harder to use. The tools themselves are straightforward enough — a magic wand selects regions of similar color (you can control the sensitivity); an eyedropper picks up colors and applies them to selections; and a lasso and a marquee tool let you



Cachet pioneers a technique for achieving predictable color output by letting users compare a target image (top left) with one of the program's reference images (top right). Also helpful is a selection of miniature images that show how a target image will look with a variety of settings applied.

remove areas of color. If you use these selective color-correction tools for simple tasks, such as bumping up saturation, it's easy.

If, however, you want to pick up a color from a reference image and apply it to a selection in your target image, you quickly run into unpredictable behavior, because photographic images are rarely characterized by areas of flat color. Even when an object *appears* to be all one color, it possesses highlights and shadows. When you apply a color from a reference image to your target image, Cachet applies the range of colors that surrounded the one you picked, while preserving the saturation and lightness in the target image. As a result, once you've applied it, the color you picked from the reference image may look somewhat different in your target image.

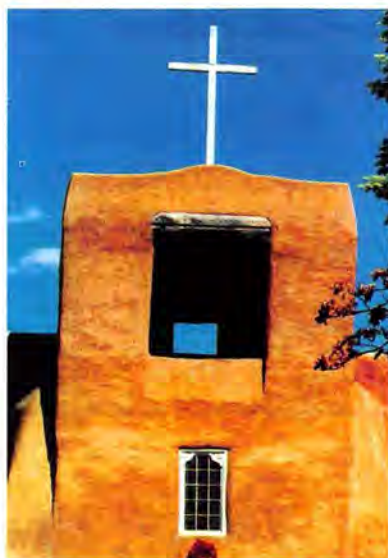
Crop and Flip

Another palette, Orientation, lets you crop and flip images as well as rotate them in 90-degree increments. This is primarily a time-saver for those occasions when you scan images upside down or inadvertently make them horizontal when they should be vertical.

Two other important tools are the Color Meter and the Gamut Alarm. The Color Meter lets you sample pixels or small areas of an image and read their color values in any of three color spaces (RGB, CMYK, or CIELAB). To sample CMYK values, you must first choose an output-device profile — CMYK values vary considerably, depending on the selected output device. Cachet's Gamut Alarm tells you which colors are out of gamut (that is, unprintable) on the output device you've chosen.

Cachet has some important productivity features. The Snapshot feature lets you record current settings and recall them instantly. You can also create scripts that record all the changes made to an image, save them, and then apply them to other images. This is useful when you're correcting several images from the same roll of film or when you want to compensate for a scanner's bad habits. In addition, Cachet offers the advantage of quick response, because it works on subsets of images, applying changes to full-resolution images only when you save.

The program accommodates Photoshop plug-in modules for acquisition and



Cachet delivers consistent color output to a wide variety of color-output devices. The image shown here was produced by two very different printers (a Kodak XL7720 [left] and a QMS ColorScript 100), using Cachet device profiles.

export. EFI includes Storm's JPEG (Joint Photographic Experts Group) compression and decompression modules with Cachet as well as a module for acquiring CMYK images (Cachet opens only RGB images).

Once you've color-corrected your image, you can print color separations from within Cachet or you can save the separations for a specific target device and import them into page-layout programs such as QuarkXPress or Aldus PageMaker.

Device Profiles

The output-device profiles that ship with the product are somewhat limited but cover a wide range of technologies. The package includes profiles for the Du Pont 4CAST, Canon ColorLaser Copier/Fiery RIP combination, HP PaintWriter XL inkjet printer, Kodak XL7700 dye-sublimation printer, and QMS ColorScript 100 thermal-wax printer. It also has press profiles for coated and uncoated stock with SWOP (Specifications Web Offset Publications) ink standards as well as for SNAP (Specifications for Nonheat Advertising Printing) inks on newsprint. EFI plans to release additional profile packs on a quarterly basis. If you don't have one of the profiled devices, you can obtain good results by choosing a profile for a similar printer. Or if your printer has a setting for SWOP simulation, you

can use the SWOP profile.

Cachet makes some hardware demands — it requires a Mac II-class machine equipped with a math coprocessor, a 13-inch or larger color monitor with at least 8-bit-color video, and at least 5 megabytes of RAM (8 megabytes or more is recommended). Cachet also requires either System 6.0.5 or later with 32-bit QuickDraw or System 7. A full installation, including reference images and tutorial images, takes approximately 20 megabytes of hard-disk space. Installation is easy, thanks to an installer that closely resembles Apple's own.

The Bottom Line

When it comes to processing color images, Cachet isn't meant to substitute for Adobe Photoshop. For starters, it lacks retouching and painting tools. However, with its special ability to make color-correction tasks faster and more predictable, it serves as an invaluable adjunct to Photoshop, particularly for users who lack experience working with color on the desktop. Its multichoice features are especially helpful, and novices can glean a great deal of information from Cachet's exceptionally clear full-color manuals. Cachet is very much a class act, pointing the way to a new era in color-image processing for novices and seasoned professionals alike.

— Bruce Fraser

Take a short

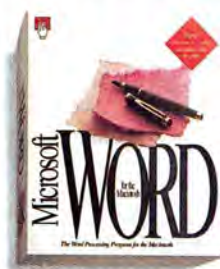


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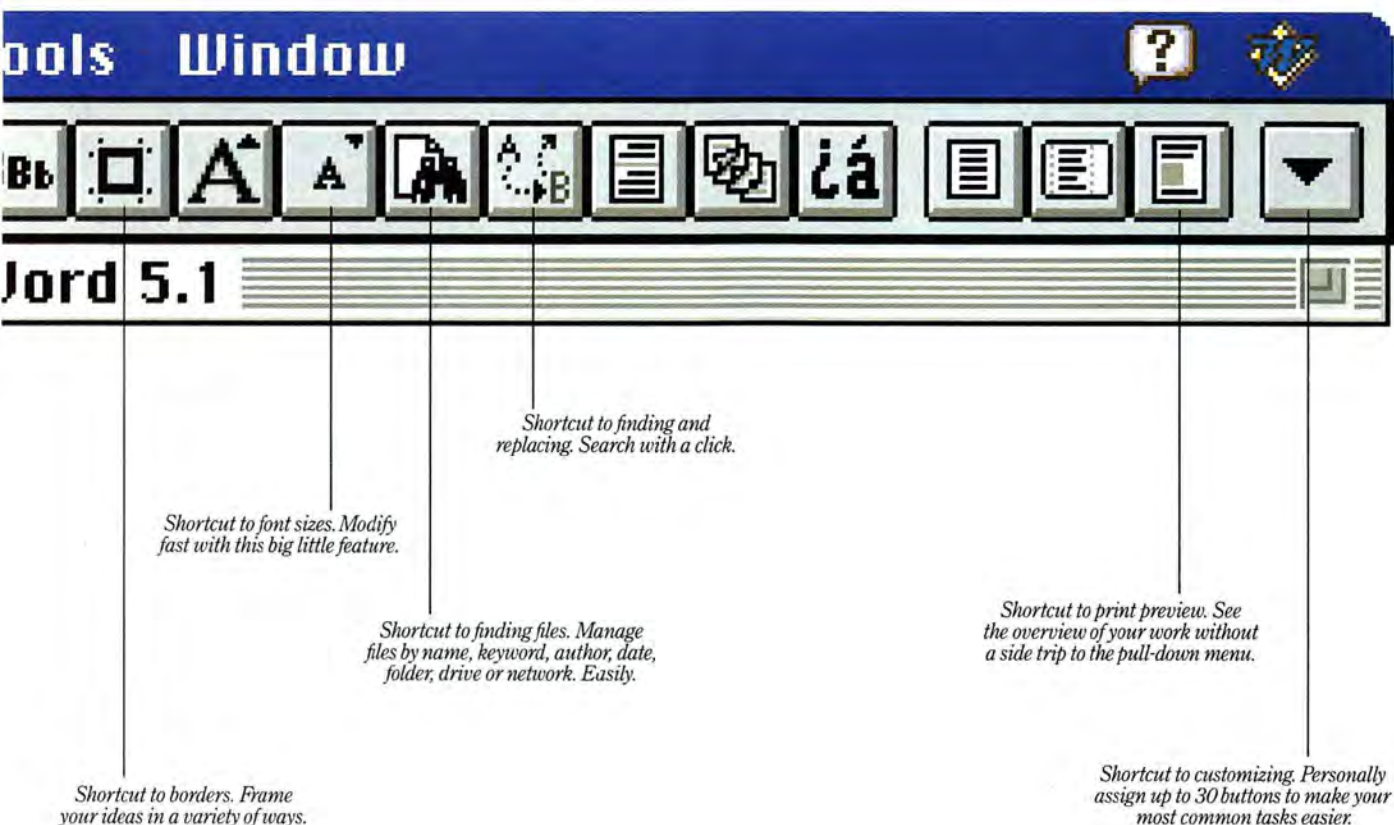
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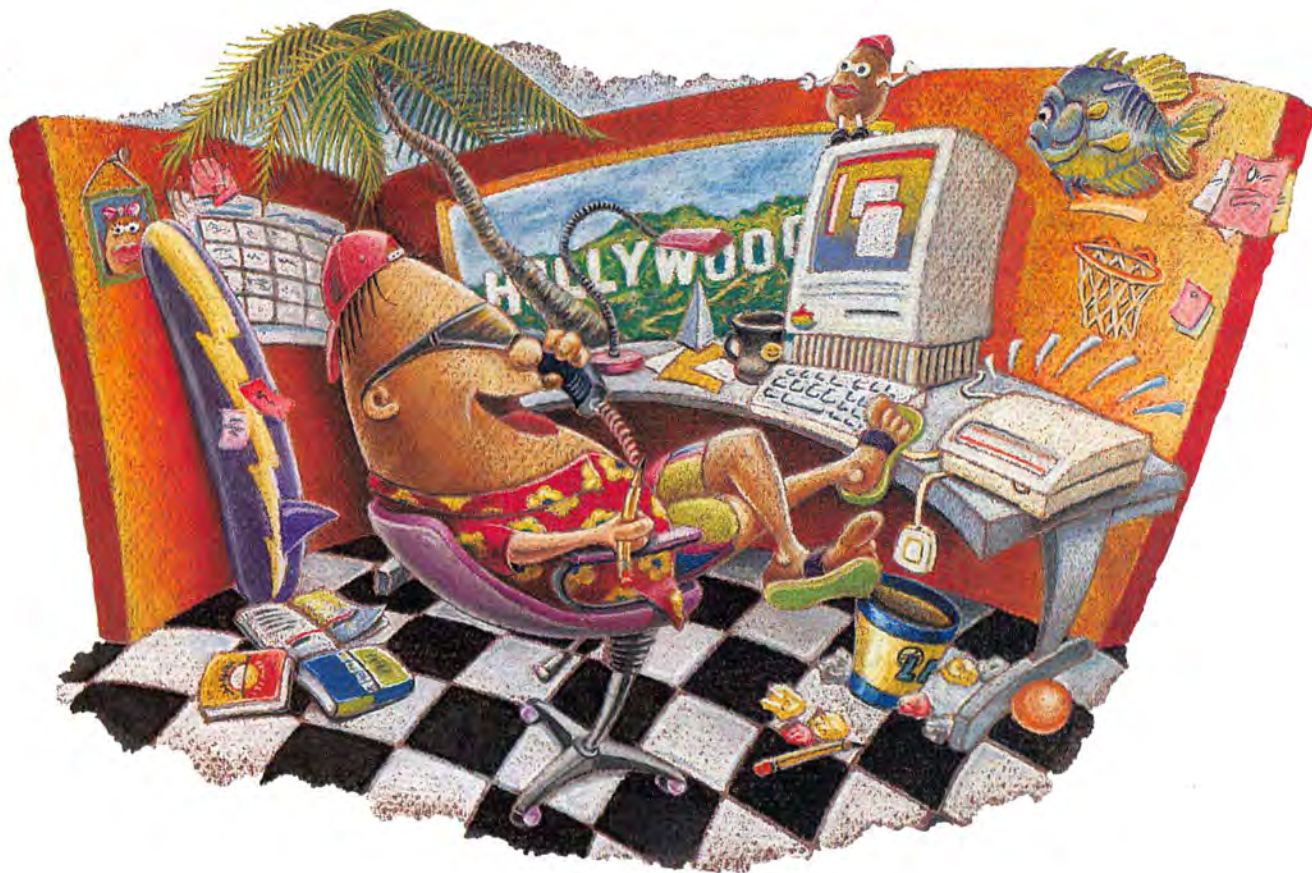
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FINANCIAL MANAGEMENT

MacInTax and Andrew Tobias' TaxCut

Two programs aim to take the place of professional tax preparers.

Although there's no clear winner in this year's race between two rival tax-preparation programs, one thing is certain: Both ChipSoft's MacInTax and MECA's Andrew Tobias' TaxCut offer a much-more-thorough tax interview than you'll get from any shopping-mall tax maven. Even if you must consult a professional preparer on some of the more esoteric intricacies of the tax code (a slim possibility in light of the 85 to 90 forms and worksheets supported by each program), the guidance and education either program provides make them worth every penny of their modest purchase price. And in case you have any qualms about trusting your return to a computer program, MECA and ChipSoft will pay any penalties incurred by calculation errors, and MECA will even pay interest on the penalties.

Hand-Holders

Because MacInTax and TaxCut match each other almost feature for feature, it's hard to recommend one program over



Andrew Tobias' TaxCut 1.0

Published by: MECA Software, Inc., 55 Walls Drive, P.O. Box 912, Fairfield, CN 06430; 203-256-5000.
List Price: \$79.95.



MacInTax 1992

Published by: ChipSoft, Inc., 6330 Nancy Ridge Drive, Suite 103, San Diego, CA 92121; 619-453-8722.
List Price: \$79.95.

the other. Each offers a flexible approach to tax preparation, providing hand-holding question-and-answer interview processes as well as the ability to enter data directly into forms. Each offers scenario comparison, so, for example, you can test the advantages of filing joint tax returns or opening an Individual Retirement Account. Each also audits your final return to catch missing data, identifies inconsistencies, and flags unusual items that may trigger an IRS audit.

By and large, we found that of the two, MacInTax — now in its tenth incarnation for the Mac — boasts the superior interface. Split screens and a handy status bar are especially useful. On the other hand, TaxCut's instructions are more accessible and better written, an advantage that will serve tax neophytes well.

If you're a newcomer to tax preparation, you'll probably want to step through the interview process. TaxCut and MacInTax present users with a series of questions and then automatically fill in all the

The screenshot shows the MacInTax 1992 software interface. It features a menu bar at the top with options: File, Edit, Forms, Tax, Tools, View, Window. The main window displays a form titled "SECTION 179 AMOUNT: Enter the amount of the 'Section 179' deduction you wish to take (or took last year) for this asset. The maximum is \$10,000. Limitations may apply, based on profits, or on your filing status." Below this, there is a text input field with "1800" entered. Further down, there is a section titled "SECTION 179" with explanatory text. At the bottom, there are buttons for "Back Up", "Help", "Tax Form", and "OK".

Both TaxCut (shown here) and MacInTax use an interview process similar to the one used by professional tax preparers to guide you through the process of filling out your tax forms.



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required forms with the responses. Unfortunately, to ensure compliance with IRS regulations, both programs use the same language for the interview process as do standard tax forms. Mercifully, however, they also provide definitions for many terms, allow users to skip steps that don't apply, and flag typical deductions. By the time you've completed the interview process, you'll have acquired a solid education in the preparation of tax forms.

Overall, because of the number of dialog boxes it uses, we found that TaxCut's interview process took considerably longer to wade through than MacIntax's. To make matters worse, the program doesn't provide keyboard equivalents for options. MacIntax takes a faster and more flexible approach to interviewing, letting you enter more than one item into a single dialog box. MacIntax also displays the line in the form where your answer will appear.

But TaxCut's method also has its advantages. The instructions and advice presented in its many dialog boxes run circles around what MacIntax provides — a real advantage if you're tackling complicated tax scenarios. For example, TaxCut takes you step by step through the process of determining whether you can claim an exemption for a dependent or whether you can use the Section 179

election to expense your home-office computer. In the case of depreciation and passive-activity calculations (rents and royalties) — one of the most formidable tax scenarios — TaxCut's interview definitely outshines MacIntax's.

The Best of Both Worlds

If you already know the ins and outs of tax preparation, you can skip some or all of the interview process in either program. You can move back and forth freely from answering questions in the interviews to entering data directly into forms. If you take a break midform, each program lets you pick up exactly where you left off in an interview — even after you've quit and restarted.

The two programs do differ somewhat in their approach to tracking your forms-preparation progress. TaxCut's Checklist provides a set of basic questions that helps the program determine which forms are required for your personal tax situation. After you've completed the Checklist, the program presents you with each form in turn. MacIntax doesn't offer this feature, but it does provide a menu item that tells you which forms remain incomplete.

Each program lets you jump to related forms as you fill out lines containing linked data. You can also include estimated values and then override them later

Of the two tax-preparation packages for the Mac, ChipSoft's MacIntax boasts the best-designed interface. Split screens and a handy status bar help you fill out your return quickly and efficiently.



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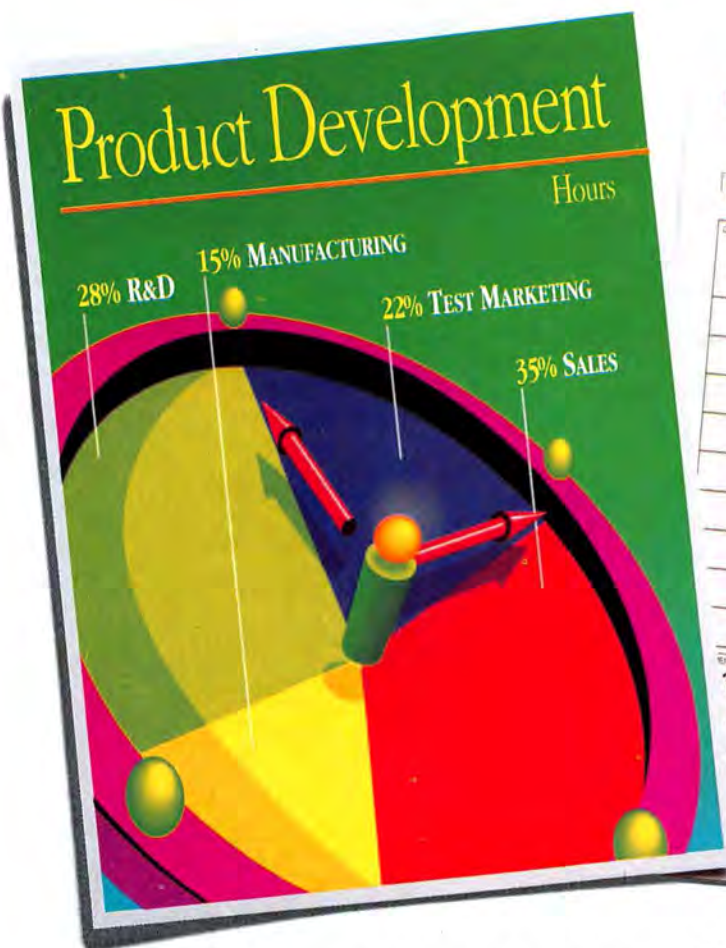
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REQUISITION NO: 163438

DATE: 12-10 REQUESTOR: *John* DEPARTMENT: NEW ORDER: TO BE USED FOR:

QUANTITY	DESCRIPTION	DATE REQUIRED	DATE PROVIDED	TOTAL COST
1	Tektronix Phaser 200 Color printer			\$3,695.00
	✓ laser paper			
	✓ 2pp/min			
	✓ Adobe PS Level 2			

APPROVED

RECOMMEND: *Recommend dual-tray option* COST: \$3,695.00

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Tektronix

REVIEWS

with actual data. Both of the packages allow annotation of forms, and TaxCut lets you mark any line items for further checking.

Audit Avoidance

After you've completed your forms, it's time to audit and print them. The audit process helps you identify missing entries and suggests ways to avoid an IRS audit. MacInTax provides two audit commands — Error Summary and Final Review. TaxCut combines the error-checking and review processes under its Auditor command.

Both programs print IRS-approved forms. All you need to do is sign the forms and attach a check, if necessary. Typically, refunds take six to eight weeks if you file by mail, because the IRS must reenter all your data. You can speed the process and reduce the chance of clerical error by filing your return electronically: Each company provides this service for \$19.95. Refunds take about two weeks and are deposited directly into your bank account. No modem is required, because you send your return to ChipSoft or MECA on-disk, along with your W-2 forms and a signed release. A service bureau transmits the data for you and checks for transmission errors.

TaxCut and MacInTax let you import data from money-management programs such as Quicken, CheckFree, and Managing Your Money. TaxCut's Import feature was inactive in the head-start version we tested, but MacInTax's Import feature worked beautifully. Both programs can also import returns prepared with their corresponding Windows versions.

Although state-tax versions of TaxCut and MacInTax were not available for testing, both companies plan to have state

versions available by the time you read this. MECA will have versions of TaxCut for California and New York (the older, Windows version of TaxCut currently supports 23 states, so we expect many more state versions to be available for the Mac for the 1993 tax year). The 1992 version of MacInTax provides state-tax versions for 15 states.

ChipSoft and MECA have greatly extended evening and weekend tech-support hours as well as fax and modem support during tax season. ChipSoft runs a free bulletin board for MacInTax questions, and MECA has a user forum on CompuServe.

The Bottom Line

Neither MacInTax nor TaxCut can substitute for tax lawyers or CPAs when it comes to setting up tax shelters, dealing with complex business leasing situations, or figuring out the cost basis of a stock you purchased 25 years ago. However, either program can eliminate much of the pain and drudgery associated with filling out most tax forms.

It's difficult to call a clear winner here, because both programs offer similar feature sets and can save you money over professional tax-preparation fees. For tax neophytes, however, our nod goes to TaxCut. TaxCut's interview process is crystal clear and really shines at simplifying complex tax scenarios such as depreciation and rental activities. For those who already feel comfortable doing their own taxes and who are looking for the fastest preparation route, we recommend MacInTax. Its superior interface lets you see at a glance what forms remain incomplete and what information is missing. But you really can't go wrong with either program.

— Becky Waring

BUSINESS USE PERCENTAGE: Enter the percent (0..100) that you use this property in your business. Note that personal use and investment use do NOT count as business use. If all use is business use, enter 100.

100

PERCENT

For most purposes, business use and investment use are treated the same.

But if your business use constitutes less than 50% of the use of the property, and the property is "listed property," then limitations on the Section 179 deduction and the depreciation allowable may apply.

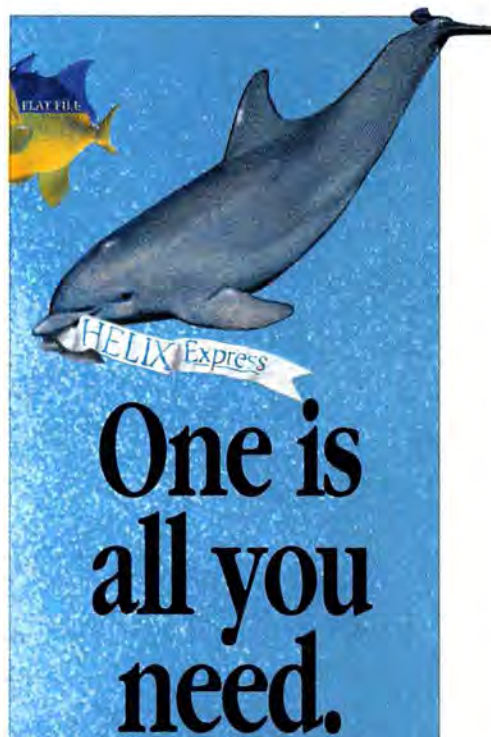
If business use starts above 50%, and then falls below 50%

Depreciation Ln 12 - Number

(Click "Tax Form" or press Esc to suspend interview)

Back Up Help Tax Form OK

Because it uses more dialog boxes, TaxCut's interview is more time-consuming than MacInTax's. The advantage, however, is that TaxCut's more detailed approach can help clarify complex tax scenarios.



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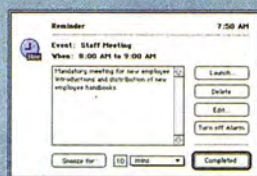


▲ Now Up-to-Date lets you schedule appointments and To Do's instantly — just click on the date you want and enter your information. Calendars can be viewed by day, multi-day, week, month or year, and can be customized in a myriad of fonts, styles and colors. You can even share schedules and events with your associates over a network or via modem.

▼ The To Do list lets you schedule tasks for certain due dates or simply for whenever you get around to them. It also allows you to prioritize tasks and automatically forwards them on to the next day's To Do list until each task is completed.

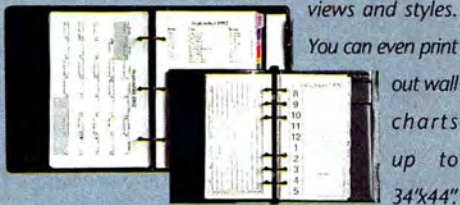


► As well as displaying the current time in the menu bar, AlarmsClock automatically alerts you



and your associates of upcoming meetings, To Do's and other events (including recurring events). Even when you're not running Now Up-to-Date.

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Now Software

PAINTING & IMAGE EDITING

Sketcher

Fractal Design gives a Painterly touch to gray scale with its latest painting and image-editing package.

Fractal Design made a big splash in the graphics arena in 1991 when it introduced Painter — a painting program that successfully mimicked the look and feel of natural media such as charcoal, oils, felt pens, and chalk. Now you can create the same kinds of artistic masterpieces in gray scale with Sketcher, Fractal Design's latest offering. Sketcher does for gray scale what Painter did for color — and the package throws in image-editing tools, to boot.

Sketcher's interface is basically the same as Painter's (see review, February '92, page 62). The program provides a scrolling Art Supplies palette with a wide variety of tools, and each tool comes with its own pop-up menu of variants. Sketcher gives you the same incredible control over pencils, charcoals, crayons, felt pens, watercolors, spray cans, and chalk that Painter does. The main difference between the two programs is that with Sketcher you're working with 256 shades of gray whereas Painter is full-color.

Sketcher does a crack job of simulating paper grains and their interaction with paint and brushes. It also comes with a few image-editing tricks up its sleeve, thanks to its marriage with ImageStudio, an 8-bit-gray-scale-image editor that Fractal Design no longer sells as a separate program.

Sketcher's image-editing tools let you manipulate scanned images in many ways: You can lighten, soften, darken, distort, posterize, equalize, flip, flop, invert, overlay, screen, and shade them (and that's only a partial list). Painting tools let you further process images by tracing, cloning, or masking them. To enhance the image-editing process, Sketcher boasts a slew of cloning commands that help transform scanned images into images that appear to be hand-drawn. Sketcher also supports Photoshop plug-ins, so you can expand your image-editing portfolio considerably.



Sketcher 1.0

Published by: Fractal Design Corp., 335 Spreckels Drive, Suite F, Aptos, CA 95003; 408-688-8800.
List Price: \$149.

Because Sketcher closely follows the model of its colorful sibling, Painter, the program suffers from some of the same frailties. For example, if you don't serve Sketcher a big helping of memory (at least 2.5 megabytes), be prepared for annoyingly slow response times. We found that the natural-media simulation experience quickly lost its appeal when the on-screen application of our strokes trailed the pen point by several seconds.

As with Painter, you must find and click on a palette's title bar to bring the palette to the front of your screen — you can't just click on any part of the palette. This gets irritating, because palettes proliferate quickly when you're using Sketcher. In addition, an Inverse Selection command (like Photoshop's) is sorely lacking in Sketcher's masking-feature repertoire. And although you can change the size of your brush tips with

Sketcher, the program lacks elaborate and sophisticated controls for editing brush tips.

On the other hand, Sketcher has remedied some of Painter's deficiencies. For example, you can work with fonts in Sketcher; Painter lacks font support altogether. Initially, Sketcher treats all fonts as masks, enabling you to fill, move, or manipulate the text. Annoyingly, however, the program makes you search for fonts with a dialog box that differentiates the TrueType variety from Type 1 fonts. A standard font list would be far preferable.

Other improvements over Painter are the addition of a straight-line masking tool, the ability to record and play back entire work sessions, and the ability to use paper textures as backdrops.

Sketcher requires a Mac Classic II, LC, II series, or Quadra with at least 2.5 megabytes of RAM, System 6.0.5 or later, and 32-bit QuickDraw. You'll also need a gray-scale or color monitor to see what you're doing (the program can run with a monochrome monitor, but it looks terrible).

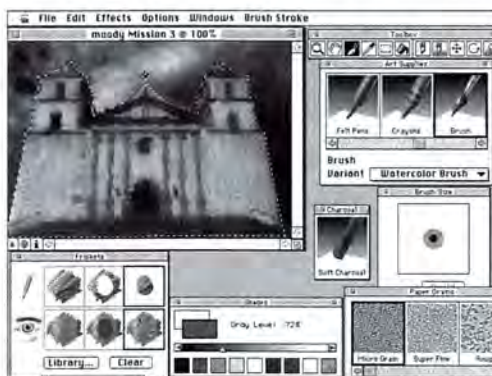
Like Painter, Sketcher is admirably optimized for use with graphics tablets. Brush strokes produce shade or width variations automatically as you change the pressure or speed of your pen stroke. We tested Sketcher with a Wacom tablet and found that once we configured the program to suit our tastes in pen pressure and speed, creating masterful strokes was a breeze.

The Bottom Line

At \$149, Sketcher is an excellent buy. For those who don't have a color display or access to a color printer, Sketcher creates great-looking output on a LaserWriter printer.

If you're in the market for an inexpensive image editor, photo retoucher, or gray-scale painting program, Sketcher is bound to please.

— Dave Valiulis



Sketcher is to gray scale what Painter is to color. Here, we've used Sketcher in concert with a Photoshop plug-in to transform a scanned photo into an image that looks hand-drawn.

WealthBuilder

Build and maintain long-term personalized investment strategies with WealthBuilder.

Given today's uncertain financial climate, a software program that can help you work toward achieving your investment goals is one valuable asset. To that end, WealthBuilder assists in formulating an investment strategy that works best for you, whether your goal is to purchase a home, finance your children's college education, or plan your retirement. The most recent version of the program features a new on-line service that helps you keep your investment strategy on target with up-to-date stock, bond, and mutual-fund prices.

WealthBuilder guides first-time users through a set of well-designed data-entry forms that quickly assemble the information it needs to devise personalized investment strategies. By the time you're done, WealthBuilder knows your name and age, your household income, your rent or mortgage payment, how much you have in savings, and so on.

The home base for WealthBuilder is the Timeline window, which displays a line graph showing how your assets are projected to grow as well as how they must grow to achieve your stated goals over the next 40 to 50 years (initially, these two lines are rarely the same). Icons above the Timeline graph provide options for developing and managing your financial strategy.

Clicking on the Home icon in the Objectives category, for example, brings you to WealthBuilder's home-purchase planner. Here, you tell WealthBuilder when you want to buy a home, how much you want to spend in today's dollars, and what percentage of the purchase price will go toward the down payment and the closing costs. You also enter assets you've set aside toward the purchase of the house.

Based on the data we entered, the program informed us that we could afford a \$108,310 home. It also told us that the \$100,000 home we've got our eye on will cost \$116,172 by 1995 (when we're ready to buy it), assuming an annual appreciation rate of 5 percent. Most



WealthBuilder 2.0

Published by: Reality Technologies, Inc., 3624 Market Street, Philadelphia, PA 19104; 800-346-2024 or 215-387-6055.
List Price: \$169.95.

important, WealthBuilder told us that we must invest \$310.66 every month at a pretax return of 5.37 percent to accumulate the \$12,779 needed for the down payment and closing costs.

Fine, but how do we achieve that investment goal? WealthBuilder has the answer to that as well. The program comes with a database that stores information on 500 mutual funds, 500 stocks, and 500 bonds. Information on each investment is very complete, from the price/book-value ratio of Abbot Laboratories to the toll-free number for the Windsor II mutual fund.

Of course, you need current information to make informed choices, so Reality Technologies offers several data-update options. For \$119.95, you receive quarterly update disks that give you the latest prices on an expanded list of 2,800 mutual funds. For \$199.95, you receive the mutual-fund data plus pricing on 5,000 stocks and 6,000 bonds.

But the best news is that with version 2.0, Reality offers an on-line communications and update service with a similar

fee-for-service price scale. For \$9.95 a month, the WealthBuilder Gold Plan provides monthly updates on the mutual funds. The \$17.95 Platinum Plan gives you both mutual-fund data and stocks-and-bonds pricing. Connect-time charges are included in the monthly fees. Each on-line plan also features one month of free service; automatic price updating of the stocks in your portfolio every time you go on-line; unlimited stock, option, and mutual-fund quotes; and unlimited E-mail access for contacting Reality's tech support. Interestingly, Reality's on-line service isn't hosted on an existing system such as CompuServe or America Online. The company developed its own system, and like the program itself, the on-line service is well designed and easy to use.

Despite WealthBuilder's many assets, there's one thing the program doesn't do: It doesn't provide a check register to help you manage your day-to-day financial affairs.

Overall, WealthBuilder is an excellent tool for devising and managing an investment strategy that works for you, but the program isn't perfect. As with version 1.0, you can still get questionable advice. For example, the program recommended that we put money needed in the short term into a long-term investment. To its credit, the program provides a well-written manual that teaches you a lot about investments in general, so once you're up to speed, you'll be able to weed out the bad advice from the good.

The Bottom Line

Street-priced at less than \$100, WealthBuilder is a bargain professional financial-planning assistant, compiling a personalized investment strategy for each user based on today's income and expenses combined with tomorrow's hopes and dreams. If you're uncomfortable living with a fuzzy financial picture of the future, WealthBuilder can sharpen your focus.

— Tom Wrona



The latest release of WealthBuilder features an on-line service that provides current stock, bond, and mutual-fund prices to help you keep your investment strategy up-to-date.

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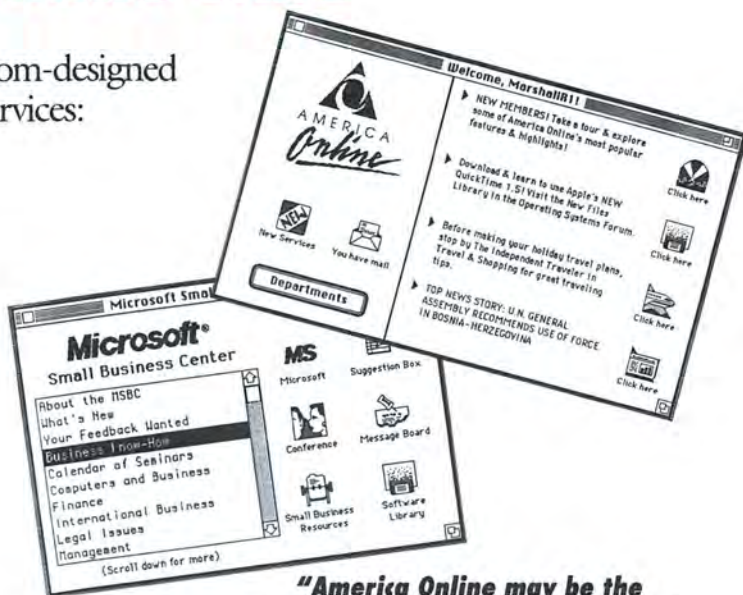
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PRESENTATIONS

Action!

Action! brings time-based motion and sound to business presentations.



Action! 1.0

Published by: Macromedia, 600 Townsend Street, San Francisco, CA 94103; 800-288-4797 or 415-252-2000.
List Price: \$495.

If you're ready to make the move from static presentations to multimedia but aren't up to dealing with the complexities of MacroMind Director, Macromedia's Action! may be a good place to start. Building on the familiar slide-making approach used by Aldus Persuasion and Microsoft's PowerPoint, Action! lets you add an impressive mix of sound, motion, and interactivity to on-screen presentations.

Slides Become Scenes

Those already familiar with Persuasion or PowerPoint will have a leg up on learning Action! Each Action! presentation is made up of scenes, which are similar to slides in Persuasion and PowerPoint. Objects such as text and graphics enter and exit scenes over time.

If you've already acquired a substantial collection of slides created with Persuasion or PowerPoint, you can import your slides and enhance them with Action!'s motion and sound effects. However, getting existing slides into Action! isn't as easy as it should be. Rather than letting you import an entire presentation as a single Scrapbook file, as you can with Vividus' Cinemation, Action! forces you to import each slide separately as a PICT file.

Despite its similarity to slide-making programs, Action! is a big step up in features and complexity from Persuasion and PowerPoint. Although its learning curve is not nearly as steep as that of MacroMind Director, Action! can't be mastered in a few hours, so be sure to set aside a solid chunk of learning time. The program's lack of an in-depth tutorial is a particularly glaring omission, given the number of unfamiliar tools it introduces.

The element of time is what sets an Action! scene apart from a slide. Each Action! scene can be as long as 60 minutes. Like a slide, the scene's background remains static, but other objects — such as text, graphics, QuickTime movies, animations, and sound — enter and exit from the stage over time.

For example, you can specify a minute-long scene that begins with music and a fade-in of your company logo onto a background. Exactly five seconds into the presentation, a title sweeps in from the right, followed by a QuickTime movie that drops in, plays, and disappears. Finally, several bullet points slide in, one after the other. As each bullet point appears, colorful shapes, accompanied by sound effects, shoot across the scene.

To create objects for scenes, you can use Action!'s text and drawing tools or import PICT and PICS graphics files as well as AIFF and SoundEdit sound files. The program provides basic text-formatting options and a palette of standard drawing tools. You create and edit objects as well as preview and play presentations in Action!'s main presentation window.

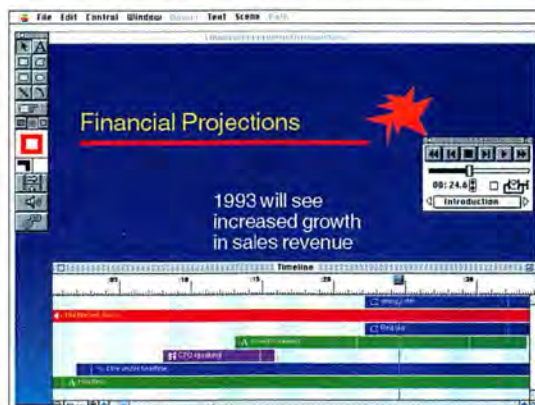
Time-Based

Action!'s time-based activity is by far the most difficult aspect of the program to master. To help you track all of your

objects and control the timing and playback of presentations, Action! provides a floating Timeline window and a control panel in which you can use VCR-like controls, a time slider, or a numerical time indicator to move through your scenes.

The cleverly designed Timeline window gives you an overview that shows how all the objects in a scene relate to one another. With it, you can control the start and end times for each object that appears on-screen. Time is measured in five-second increments on a ruler at the top of the window. Each object is represented as a horizontal bar. To change an object's start time, you simply drag its bar to a new location relative to the ruler. To change its duration, you graphically resize its bar. Each bar is marked with a distinguishing icon and object name. Unfortunately, Action! assigns the nondescript default name Object #x to text objects. You can edit the name, but it would be helpful if Action! automatically named text objects according to the text itself.

Once you've created your scene objects and arranged them in the Timeline window, the real fun begins. You're ready to add transitions, motion, sound, and lighting effects to elements. For this phase, the program packs a powerful one-two punch — it provides an excellent selection of effects teamed with



Action! lets you use motion and interactivity to jazz up your presentations. The program's Timeline window (bottom) and the control panel (right) help you manage time-based activities, although mastering this aspect of the program can be a chore.

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accessible dialog boxes that are easy to use.

The Edit Object dialog box lets you modify the attributes of any element, including sound, transitions, and inks (inks let you control an element's transparency and color blends). The dialog box's pop-up menus and clearly illustrated options help you glide through a plethora of choices.

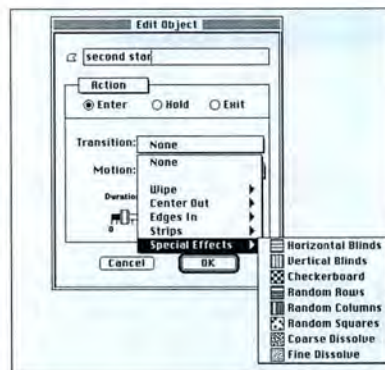
Action!'s transitions and motion effects for entrances and exits are particularly noteworthy. You can choose from 30 transition effects, including checkerboards, dissolves, and vertical blinds. Motion effects really set Action! apart from slide-making programs: You can make elements slide in from any edge of the scene or move along user-defined multipoint paths.

Controls for creating interactive objects aren't as extensive as those of Interactive Media's Special Delivery, but they're adequate for creating buttons with which users can then navigate a presentation. Buttons can pause and resume action as well as lead users from one scene to another.

The Content list acts somewhat like PowerPoint's Outline view. It displays an entire presentation in a single window, which makes it handy for naming elements, modifying text in text elements, and cutting and pasting elements to move them within scenes. Action! has also successfully borrowed the template concept from static-presentation programs, but the package's template selection is limited. A modest library of graphics, sounds, and animations and an introductory videotape are included in the package.

The Player

The initial release of Action! lacks a run-time player — a big drawback if you want to distribute your presentations. According to Macromedia, however, this situation will be remedied by the time you read this. The company plans to send the player free to registered users of version 1.0 (the player will also be available through CompuServe, America Online, and AppleLink). A Windows version of Action! is available, but the Mac and Windows versions are completely incompatible. Of course, you can opt to sacrifice interactivity and print your presentation to video for distribution if you've invested in the proper NTSC or PAL video card.



Action's Edit Object dialog box lets you set transition and motion effects as well as control the time and duration of each object's appearance on-screen.

Action! suffers from unacceptably sluggish performance when graduated fills are used for scene backgrounds. In addition, it's difficult to work with white text, because the text remains white when it's selected, making it nearly impossible to edit.

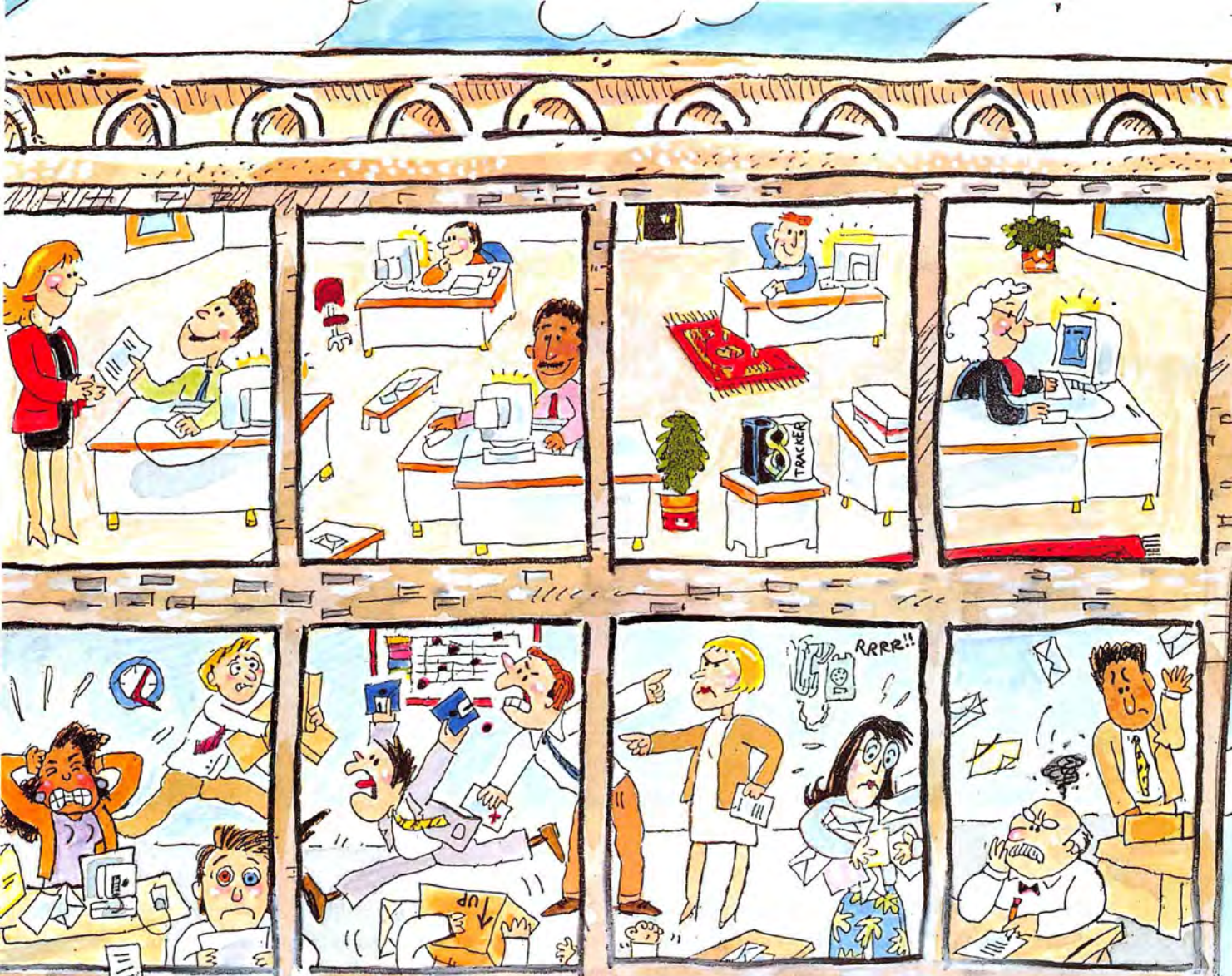
Action! requires System 7 (publish-and-subscribe is not supported), 4 to 6 megabytes of RAM, and at least a Mac IIfx.

The Bottom Line

Action! is not the first program to focus on making multimedia presentations easier to create. Macromedia's Magic and Vividus' Cinemation, which both preceded Action!, also target this area, although their primary emphasis is on frame-based animation. Action! focuses strictly on presentations, adding the elements of time and motion to the familiar slide-making approach of Persuasion and PowerPoint.

Although Action! deserves credit for attempting to simplify the complex process of coordinating numerous diverse elements — including graphics, interactive objects, QuickTime movies, and sound — into a single, cohesive presentation, mastering the program's concept of time-based activity is no trivial chore. Unlike PowerPoint and Persuasion, which are designed to allow users to create presentations quickly with a minimum of time and effort, Action! comes with a fairly steep learning curve. The payoff is worth the trouble, though, if you're looking to add real pizzazz to your presentations.

— Shelley Cryan



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Alias Sketch!

Sketch!'s free-form curves run circles around other 3-D-design programs.

For free-form 3-D design, no Mac tool priced at less than \$1,000 can match Alias Sketch!, a modeling and rendering package that brings the power of Alias' workstation software to the Mac. Sketch!'s innovative tools and ability to draw free-form curves in 3-D perspective make the program a good choice for illustration and package design. Version 1.5 offers several enhancements over the initial release, including improved redraw and ray-tracing speed as well as better handling of Adobe Illustrator and Aldus FreeHand imports.

Throwing Curves

You draw and render 3-D designs in a single Sketch! window. The program's responsive and accurate 3-D pencil mimics the freehand tools in Adobe Illustrator and Aldus FreeHand. Sketch!'s curve-o-matic tool, however, presents a new paradigm for curve drawing that may frustrate those familiar with traditional Bézier tools. Fortunately, if you can't get comfortable with Sketch!'s drawing tools, version 1.5 lets you directly import any 2-D object created with Illustrator or FreeHand (including compound objects).

In Sketch!, objects created in 2-D become the building blocks for 3-D shapes. You can extrude any 2-D object along a curve or 3-D line or revolve it on a user-defined axis. Sketch!'s putty and handle tools let you further modify objects by stretching any point or outline.

Because surfaces in Sketch! are NURBS-based (NURBS, which stands for nonuniform rational B-splines, is Alias' geometric model), you can actually draw on them, which makes it relatively easy to precisely join two curved objects such as a teapot and its spout. Unfortunately, Sketch! lacks the skin tool common to most other 3-D modelers.

Once you've created 3-D objects, you can group and ungroup them in much the same way as you organize files and folders in the System 7 Finder. By clicking on a triangle, for example, you can



Alias Sketch! 1.5

Published by: Alias Research, Inc., 110 Richmond Street E., Toronto, Ontario M5C 1P1, Canada; 416-362-9181.
List Price: \$995.

expand and collapse groups. Overall, Sketch! gives you powerful tools for selecting single objects from within complex designs. The program also provides a library facility — complete with picture previews — for storing assemblies, backgrounds, and surfaces.

Material Options

To complete your designs, you can apply materials to 3-D wire-frame surfaces. Sketch! provides a wide variety of options with its Materials editor, which gives you simple sliders and point-and-click choices for setting color transparency, bumpiness, and surface finish. You can also import TIFF, PICT, and Alias PIX files and map them to object surfaces. Unlike most other 3-D programs in its price range, however, Sketch! doesn't let you use imported images to alter the specular and reflectivity of surface finishes.

With version 1.5, Sketch! has an interactive dialog box that gives users immediate visual feedback as they position

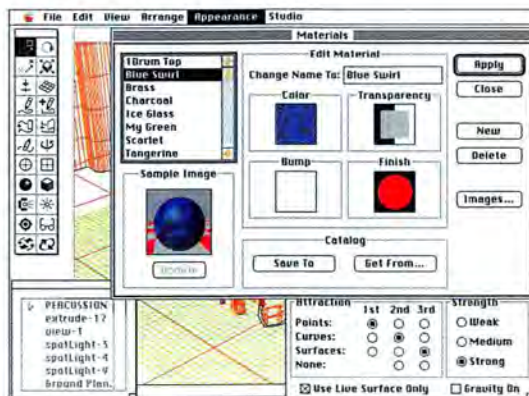
objects and wrap materials around them. This makes complex tasks such as wrapping labels around wine bottles relatively easy, especially because Sketch! gives you the added ability to choose the type of surface mapping — cylindrical, planar, spherical, or parametric. Sketch! also allows environmental mapping on an object-by-object basis, making it easy to create simulated reflections.

No 3-D scene is complete without lighting. With Sketch!'s robust lighting selection, you can simulate virtually any lighting condition. Sketch! provides an unlimited number of light sources, including standard point lights (for a light-bulb effect), spotlights, and distant lights that simulate the sun. To alter the lighting, you move sliders that simulate drop-off, decay, and intensity.

The program's camera provides WYSIWYG views of scenes, allowing you to precisely adjust your viewpoint before rendering. Unfortunately, the program's zoom, pan, and rotation controls are unconventional and unintuitive. Overall, Sketch! lets you achieve just the right angle on a scene, but learning to use its viewpoint controls requires some practice.

Top-Notch Rendering

The final step in completing your design is rendering. Sketch! produces remarkable results, whether you use the



Alias Sketch! 1.5 is the best 3-D tool in its price range for creating smooth, curved objects in 3-D perspective. The program also gives you an extensive selection of materials for mapping to 3-D objects you've modeled.

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program's Phong shading or its true ray tracing for photo-realistic output. In fact, Sketch! is among the top renderers in its price range.

No discussion of rendering would be complete without a mention of Sketch!'s remarkable match-backdrop tool, which enables the program to apply perspective to imported photographs. This tool saves time and effort by letting you add 3-D objects to photographic images, so you can create stunningly realistic 3-D scenes — complete with proper perspective — without building them from scratch.

Given Sketch!'s complexity, a good manual and tutorial are essential. The Sketch! package includes a thorough one-hour video tutorial as well as two step-by-step procedure tutorials. Sketch!'s unique tools are often not intuitive, but we found the tutorials a real help in getting up to speed. Sketch! also provides copious Balloon Help that far surpasses that of most other programs. Balloons contain not only short descriptions of tool functions but also keyboard command equivalents and references to pages in the manual.

Sketch! is an excellent 3-D package, but it comes with a few rough edges. The program's NURBS-based geometry limits Sketch!'s strengths to curved surfaces. It's virtually impossible, for example, to putty a surface in order to form a straight

edge. In addition, the NURBS model devours system resources. We recommend a Mac IIx or Quadra and at least 12 megabytes of memory for Sketch! Finally, the program's Gravity command — for snapping objects to points, curves, and surfaces — is decidedly clumsy. Most users would be better served by a 3-D implementation of Aldus FreeHand's Alignment dialog box.

The Bottom Line

With version 1.5, Alias has addressed most of the weaknesses of the initial Sketch! release. The ability to import 2-D drawings from Adobe Illustrator and Aldus FreeHand is a particularly welcome enhancement, given the somewhat cumbersome nature of Sketch!'s curve-drawing tool. Performance improvements are also much appreciated.

In addition, Sketch!'s Materials editor provides a slew of eye-catching options for mapping surfaces to wire-frame objects. Last but far from least, Sketch!'s special ability to apply perspective to scanned photographic images is a powerful feature that will allow artists to integrate 3-D art with the 2-D world of photography.

Overall, graphic designers who want to make the move from 2-D to 3-D will find that Sketch! breaks new ground in Macintosh 3-D illustration and design.

— Sean Safreed



Alias Sketch! provides a myriad of light sources for enhancing your designs. In addition, you can extrude text imported from Adobe Illustrator.

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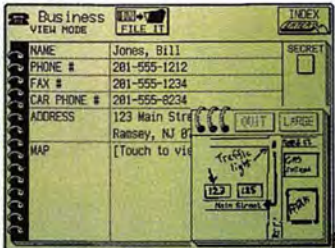
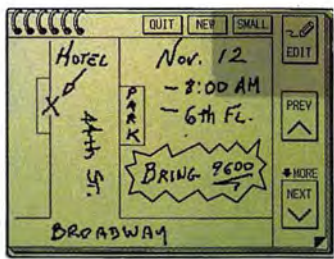
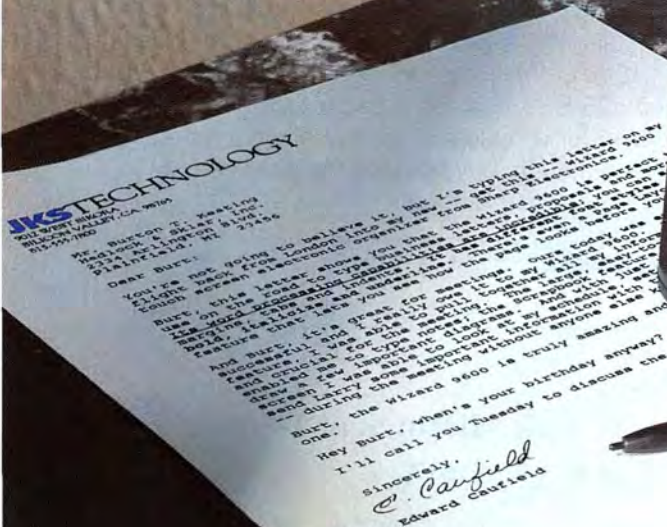
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Image Assistant

The innovative Image Assistant offers a more affordable but less sophisticated alternative to Photoshop.

Billed by its maker as "the intelligent business imaging tool," Image Assistant is designed to help novices decipher the intricacies of color-image editing. Several innovative features and an affordable price make Image Assistant an attractive alternative to the professional-level Adobe Photoshop for those who don't require Photoshop's advanced features. However, sluggish performance and an unconventional interface detract somewhat from Image Assistant's overall usefulness.

Helpful Tools, Few Amenities

The \$495 Image Assistant costs considerably less than the \$895 Photoshop, but it lacks support for Photoshop plug-ins and its filter selection isn't on a par with that of Photoshop. If you can do without those Photoshop amenities, you'll find Image Assistant to be a capable image processor.

The program's main palette provides a solid set of selection, viewing, and editing tools, including a pencil, paint bucket, airbrush, smudge brush, rubber stamp, and eyedropper. You can customize most of the brushes by changing their size, shape, speed, opacity, and so on. Other control palettes let you set foreground and background colors as well as mix custom colors on a scratch pad.

You can scan and edit 24-bit color images in the RGB (red, green, blue), CMYK (cyan, magenta, yellow, black), or HSV (hue-saturation value) color models. Image Assistant also offers full support for the PMS (Pantone Matching System) and DCS (Desktop Color Separation) models. As with Photoshop, you can display and work with specific image channels such as red, green, cyan, gray, or mask. The program can also convert color images to gray-scale and black-and-white.

Image Assistant's selection tools allow you to create complex rectangular or free-form masks that contain more than one area of an image. You can save masks with their files in the TIFF


Image Assistant 1.0
Published by: Caere Corp., 100
 Cooper Court, Los Gatos, CA
 95030; 408-395-7000.
List Price: \$495.

format, but the program doesn't let you save multiple masks in separate channels, as you can with more-sophisticated image-processing programs such as Photoshop.

You can create realistic composites with Image Assistant by pasting a part of an image behind a selected area in the main image. Paste controls let you adjust the opacity of the underlying pasted area and feather its edges so that it blends with the main image.

Image Assistant's text support is basic. The text tool lets you create text objects, but the program can't generate anti-aliased type, as does Photoshop. Moreover, we encountered problems running Image Assistant under System 7.1 with ATM installed — Type 1 PostScript fonts did not appear in the Text-tool dialog box.

Although Image Assistant doesn't offer Photoshop's level of sophistication, the program does a good job of simplifying image-processing tasks. The program's two best features are its innovative Assist mode and its Print Sampler. The Assist mode offers a simple

alternative to the time-consuming process of repeatedly modifying settings to get the right effect. For example, to adjust the brightness or contrast of an image, you click on the Adjust Tone button. Image Assistant opens a dialog box and displays 15 versions of the current image along with 15 brightness/contrast settings. You simply choose the one that looks best to you.

Similar timesaving Assist-mode options are available for other image-enhancement operations, including color adjustment, smoothing and sharpening, and special effects. Even when you're not in Assist mode, the image adjustments you make in dialog boxes are immediately reflected in the images themselves: You don't have to go through the awkward preview step required with Photoshop.

Another time-saver, Print Sampler lets you avoid the trial-and-error process of printing numerous versions of the same document to arrive at the desired image. Print Sampler prints thumbnails of your image at different settings on a single sheet of paper; you simply select the thumbnail you like best and print the final copy.

One of Image Assistant's biggest promises is one-button scanning with its "smart controls." By default, smart controls automatically manage a variety of image-processing operations, including straightening and cropping images,

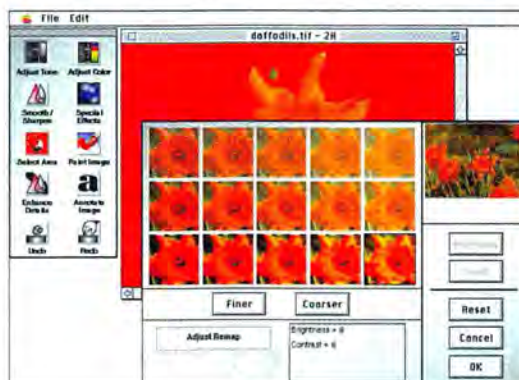
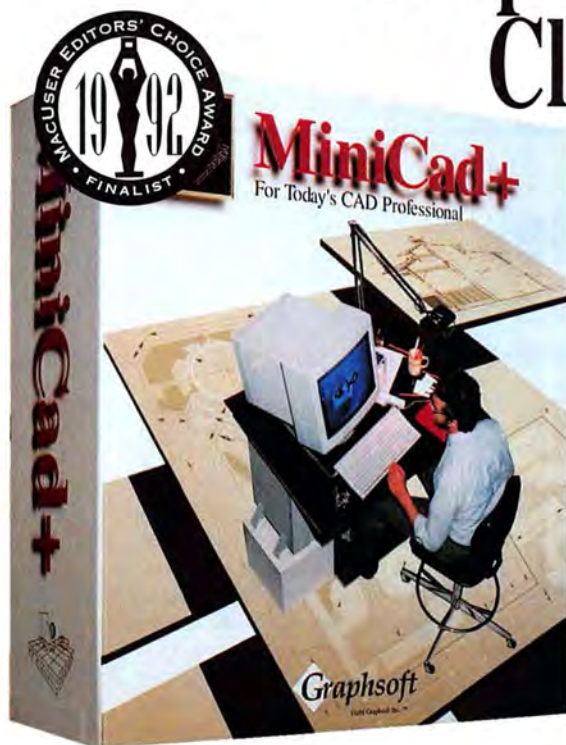
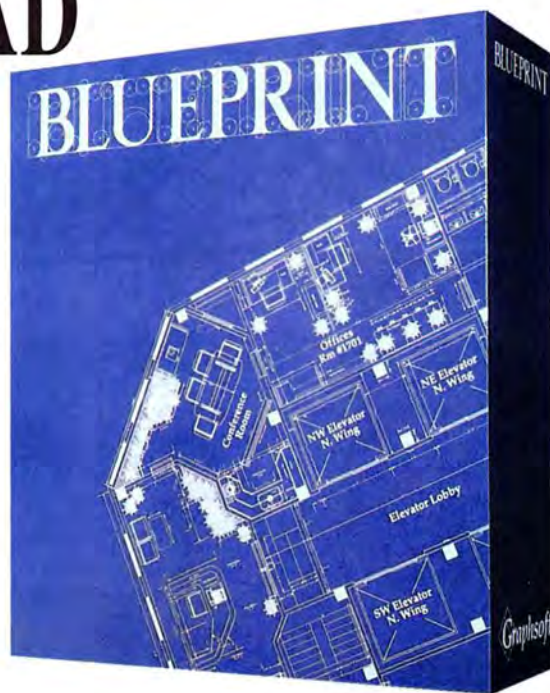


Image Assistant aims to simplify the color-image-editing process. The innovative Assist mode, shown here, helps nonprofessionals make adjustments to settings such as brightness and contrast. However, the program's smart controls exact a big performance hit.

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determining the best image format (half-tone, gray-scale, line art), adjusting brightness and contrast, and filtering image noise.

However, we found that smart controls adversely affected image-processing performance. Processing an 8.5-x-11-inch image on a IICI, for example, required eight minutes with smart controls turned on and only one minute with the controls turned off. By comparison, Photoshop processed the same image in 21 seconds.

The program as a whole is sluggish. It's forever playing catch-up with mouse clicks, and it often redraws the entire screen—including all open palettes and control windows—rather than just the image window itself. In addition, Image Assistant's interface is at times unconventional. The selection tools, for example, create masks instead of placing standard marquees around selections.

Image Assistant supports a wide variety of common graphics file formats, including TIFF, PICT, MacPaint, PCX, EPS, DCS, GIF, XWD, BMP, Scitex CT, and JPEG compressed. The manual is clearly geared toward novice users. Experienced users will find that it pales beside Photoshop's documentation. The index is particularly disappointing—errors in page-number references abound.

Image Assistant requires a Mac II-class machine or better, 5 megabytes of RAM, 5 megabytes of disk space, and System 6.0.7 or later. The program supports pressure-sensitive tablets and works with the following scanners: the Apple OneScanner, Epson Color Scanner, and Hewlett-Packard ScanJet Plus and II series and models from Microtek and Ricoh. You can configure the program for your specific scanner and monitor.

The Bottom Line

At \$495, Image Assistant offers an attractive alternative to the more expensive Photoshop for nonprofessional users, although you get what you pay for. Image Assistant provides several innovative features, such as the Assist mode for fast and hassle-free setting adjustment, that give inexperienced users a leg up on the image-editing process. But the program's lack of support for the industry-standard Photoshop plug-ins, its limited selection of built-in filters, and its lackluster performance relegate it to second-string status.

— Gregory Wasson

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Expanded Book Toolkit

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If you're a would-be publisher held back by high printing costs or the limitations of paper, the Voyager Company's Expanded Book Toolkit may be the breakthrough you've been waiting for. Expanded Book Toolkit takes the HyperCard-based technology Voyager has used to publish its own expanded books (screen-readable Mac versions of titles ranging from Herman Melville's *Moby Dick* to Susan Faludi's *Backlash*, enhanced with electronic annotations and on-the-fly searching) and makes it available to anyone who has HyperCard 2.1, \$295, a Mac with 2 megabytes of RAM, and something to publish.

By and large, the program's creators have kept their promise to insulate would-be bookbuilders from HyperCard's inner workings (although users familiar with HyperCard will have a slight leg up). Even so, creating a quality electronic book requires the same painstaking effort that goes into producing conventional books. Typesetting and proofreading are still essential — preferably done with a good word-processing program, because HyperCard's text-handling capabilities are primitive. Mercifully, Expanded Book Toolkit has special tools to help fix widows and orphans and to reflow text. Other tools let you add annotations, which can be pop-up windows, documents, sound files, picture files, HyperTalk stacks, or even selections from compact discs or laserdiscs (you need additional Voyager software to control these media).

One important caveat: Because this is HyperCard, nothing happens quickly. Importing a 4,700-word document took us nearly three minutes on a IIcx, so we hate to think how long it must have taken for Voyager to import *Moby Dick*. Anyone planning to publish lots of titles will want to use this software with the fastest Mac possible.

Once your expanded book is finished, you're free to distribute it noncommercially. If you plan to sell it, however, you need to pay royalties to Voyager: 1 percent of the retail price for each copy sold or distributed, with a minimum payment of 15 cents per copy.

Whether the Expanded Book format

takes off beyond Voyager's own efforts depends on many factors: whether people continue to read books on their PowerBooks once the novelty has worn off; whether Claris can deliver a faster, more capable HyperCard; and whether other publishers — like you, perhaps — get in on the act. Now's your chance.

The Voyager Company, 1351 Pacific Coast Highway, Santa Monica, CA 90401; 310-451-1383. Version 1.0. \$295.

— James Bradbury



Square One

★★★★

Square One's publisher, Binary Software, describes the program as a "graphical desktop-management solution," which, in case you're not fluent in Macspeak, means it's a file launcher — but with a difference. Instead of simply presenting lists of files to launch, Square One creates a palette on your desktop where you can place icons for frequently used applications, folders, DAs, control panels, and even QuickKeys. You can also attach documents to applications and designate a default document (such as a letter or report template) that automatically opens when you launch a particular application. Another useful feature lets you create *workgroups*, which open several documents and applications simultaneously — Photoshop, Illustrator, and a couple of graphics files, for example.

Square One's best feature is that it's simple to configure — you probably won't need to read the manual. A Find Applications menu item automatically finds all applications on any mounted disk (including file servers). Just select the applications you want to add, and their icons appear on the palette. (You can also add applications by dragging their icons onto the Square One application's icon.) One drawback is that applications' icons remain after the applications (or linked documents) are long gone from your Mac; a menu option for finding and deleting orphaned icons would be a nice addition to future versions.

Square One's simplicity makes it great for Mac novices, and because the program lets you put QuickKeys and UserLand's Frontier scripts onto its easily accessible desktop palette, it's a power user's tool as well.

If you're accustomed to using a hierarchical-menu utility such as NowMenus

or On Cue, Square One may take some getting used to (your mouse will keep drifting over to that Apple menu), but it quickly becomes addictive. Square One's palette takes up more of your screen than the Apple menu does, but if you have the room for it, you'll find this product an efficient and well-designed addition to your productivity arsenal.

Binary Software, 2210 Wilshire Blvd., Suite 900, Santa Monica, CA 90403; 310-582-8293. Version 1.0. \$59.

— Victoria von Biel



CheckWriter

4/0


★★★

If you think check-writing software should be as attractive as the designer checks you pick out, you won't like CheckWriter 4/0. The documentation is poorly designed and awkwardly written. Windows and dialog boxes are disorganized collections of lists, lines, icons, and pop-up menus in various fonts and styles, some of which are hard to read; even the menus use an ugly condensed version of the standard Chicago font.

But looks aren't everything, and CheckWriter does pretty much everything you'd want a computerized checking program to do (except let you pay your bills electronically — it doesn't support Check-Free). Not just a computer copy of your real checkbook, CheckWriter can be your real checkbook, because you can print checks. Blank check forms are available from a variety of sources, and CheckWriter's Forms Designer lets you match any paper form exactly.

Why bother entering check transactions and printing them out when you can just as easily write a check? Because CheckWriter offers two capabilities your checkbook can't give you: automatic transactions and the ability to generate reports. Automatic transactions are the ones that occur at regular intervals: the mortgage payment, the car payment, and so on. You enter the basic information only once; CheckWriter creates subsequent checks automatically on specified dates. As for reports: Need to know how much you spent on child care last year? On car repairs? Once the information's in there, CheckWriter lets you retrieve it every which way.

CheckWriter provides a multiple-account capability, which means you can



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track not only your checkbook but also your savings account, the balance on your car loan, and how much you owe on all your plastic. An extension reminds you, when you start your Mac, of any transactions that need attention. There's also a Financial Services submenu that comes in handy for figuring out how much of a car loan you can handle or (to depress you completely) how much you need to save for the kids' college expenses.

With its import and export capabilities and its ability to print checks and compile reports, CheckWriter is a decent program that's likely to meet your check-writing needs. But without helpful documentation, CheckFree support, and an interface face-lift to make it easier to use, CheckWriter is no match for its main competitor, Quicken, and related programs such as Managing Your Money.

Aatrix Software, Inc., 523 N. Washington Avenue, Grand Forks, ND 58203; 800-426-0854 or 701-746-6801. Version 4.0C. \$79.

— Sharon Zardetto Aker



SimLife

★★★★½

Maxis, the company that knows how much fun it is to play God, has just introduced a new software toy to join the ranks of SimCity, SimEarth, and SimAnt. The company's latest, SimLife, lets you create plants, animals, and ecosystems to do your bidding.

Your first act is to create a new world, complete with mountains, seas, and temperature and moisture zones. If you're feeling particularly spunky, you can design plants and animals from scratch rather than use those provided with the program. Your next likely steps are to strew a few life-forms over the landscape and then watch them struggle and die off in short order. Ah well — even gods have days when they can't create a functional ecosystem right off the bat.

SimLife provides several tools for altering the geography and physics of your world as well as the genetic composition

of its inhabitants. As The-One-Who-Must-Be-Obeyed, you have the power to manipulate such variables as climate, the length of days and years, and the amount of energy your creatures expend as they move. You can also modify each animal's gender, life span, social patterns, diet, and size. Likewise, you decide the sex of your plants, whether they will grow on land or on sea, and what conditions are optimal for their survival. If you're an impatient deity, you can change your organisms' genetic structure on the fly.

SimLife is clearly more toy than game; although it includes graphs and an evaluation window for charting your progress, there is no way to really win and your goals are largely up to you. It's both a fun toy (for laughs, check out SimOffice on the accompanying data disk) and an educational toy — one that can pull you into a fascinating and serious study of ecosystems and genetics.

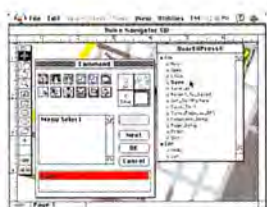
Whether you want to learn about genetics and ecosystems or simply like to muck about with life-forms that have no



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— Christopher Breen



Miracle Piano Teaching System



The Miracle Piano Teaching System comes with everything a would-be Van Cliburn needs: a 49-key keyboard instrument that connects to your Mac through the modem port, cables, a power supply, headphones, a foot pedal, and some very intelligent piano-teaching software.

The Miracle keyboard is a full-fledged synthesizer (with a built-in amplifier and speakers) that can reproduce 128 different instrument sounds and play 16 notes simultaneously. Like an acoustic piano's

keyboard, the Miracle keyboard is pressure-sensitive — the harder you strike a key, the louder it plays. Because it includes MIDI (Musical Instrument Digital Interface) support, you can use it with sequencers and other music software.

Although the hardware is quite good, the software is what makes the Miracle so miraculous — it's extremely interactive and easy to use, with on-line help always available. The Classroom module, where you'll spend most of your time, contains 40 chapters.

Each chapter starts with some basic instruction, and then you begin learning a song. A phrase appears on-screen, the Miracle plays it for you, and then you play it yourself. When you have trouble, the software tells you what you're doing wrong and gives you another chance. You advance through the chapter only by mastering each phrase. You graduate to the next chapter (and a new song) when you can play the entire song without making any mistakes.

Besides the Classroom, the Miracle

offers a pair of arcade games to help you hone your playing skills. In one game, ducks fly across a staff — you shoot them by playing the note that corresponds to their placement on the staff. In another, you save descending parachutists by playing the proper chord before they hit the ground.

Our only major criticism of the software is that it's somewhat sluggish — moving from screen to screen takes longer than it should, even on a IIx.

Can you really learn to play piano using the Miracle Piano Teaching System? By Chapter 6, you'll understand time signatures; whole, half, and quarter notes; and chords and you'll be able to play simple songs with both hands. By the end of the course, you should also be able to read music notation and learn new pieces of music on your own. And that really is a miracle!

The Software Toolworks, 60 Leveroni Court, Novato, CA 94949; 415-883-3000. \$419.95.

— Bob LeVitus

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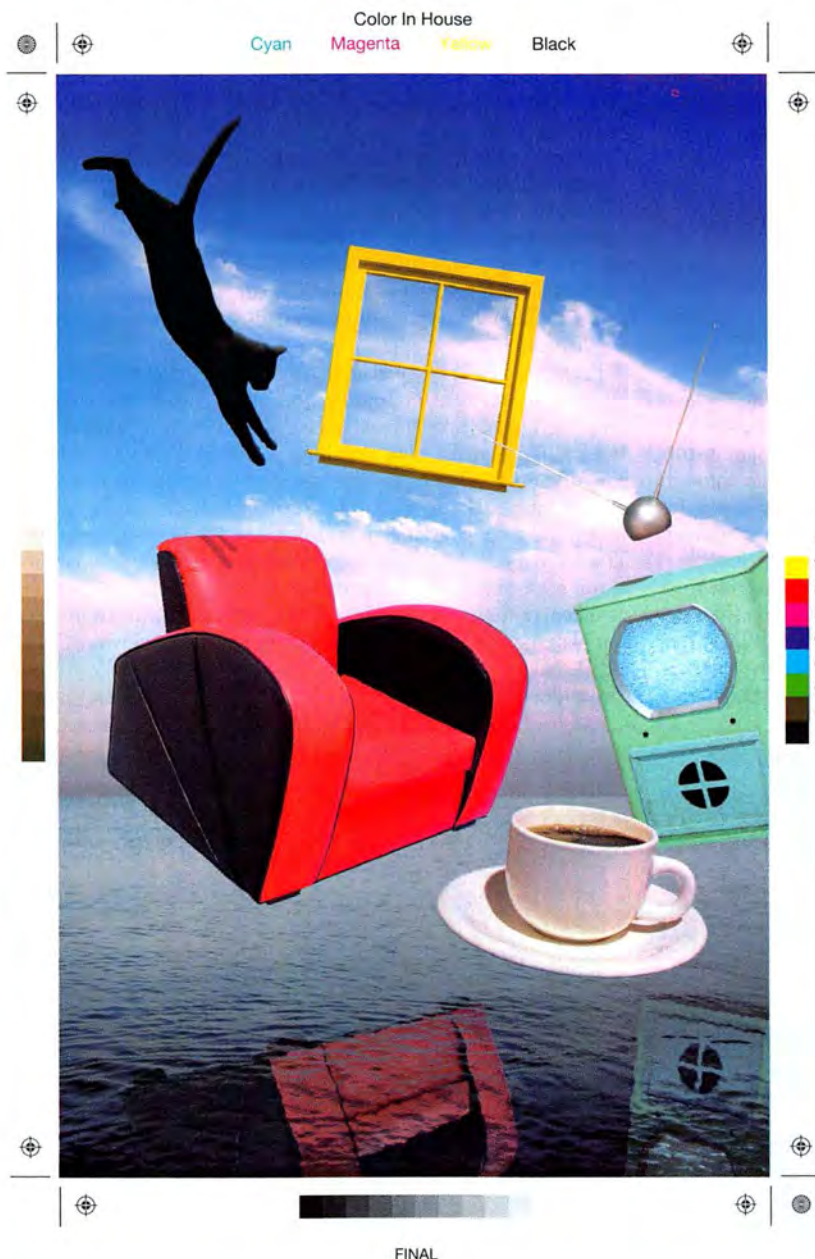
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MacUser

The 8th Annual Editors' Choice Awards

Each year, the editors of *MacUser* evaluate hundreds of new Mac products. By the end of 12 months, we have a clear sense of which ones really stand out. We can also see trends that are shaping the market. These trends help us determine categories for the ultimate recognition we can bestow on a Mac hardware or software product: a *MacUser* Eddy Award. In 1992, for example, the popularity of Apple's PowerBooks fueled development of products tailored for notebook computers — so this year we added a new category for portable-computing products. The Mac's aptitude for multimedia spawned specialized software for creating visual effects. Accordingly, we created a new category to recognize achievement in that area. Continued innovation in the areas of color and multimedia is reflected in our choices for Hardware and Software Product of the Year as well.

The Eddy Awards are not a popularity contest. *MacUser's* editors spent months evaluating, lobbying for, and arguing about the merits of all the products released during our 1992 eligibility period. In deciding which products deserve Eddy nominations, we always make utility and value key considerations, but innovation and overall quality are also important factors. It took countless hours of discussion to narrow the field to three nominees in each category. A secret ballot determined the winners.

In addition to choosing the best overall hardware and software products of the year, we give three special awards. We reward the year's best new technology — a technology that's sure to have an impact on future product development and to change the way we use our Macs. And because creating all these great products requires great people, we recognize the excellence of the individuals behind the products, with the John J. Anderson Distinguished Achievement Award and the Derek Van Alstyne Rising Star Award, named posthumously in honor of two *MacUser* staff members.

And now, the envelopes, please . . .

By The Editors of *MacUser*



MacUser Editors' Choice Awards

Best New

Text Tool

Word 5.1

In addition to "Best New Text Tool," Microsoft **Word 5.1** could easily have won a category called "Best New Upgrade Value" (or perhaps "Best New Cheap Thrill") for the magnitude of the improvements Microsoft packed into a \$15 upgrade. Click buttons on the new, customizable tool bar to shrink or expand fonts, print envelopes, create bulleted lists, or create tables — the graphical table-creation feature lets you quickly drag out a region with the desired number of rows or columns. You can also annotate text with pop-up notes and create instant drop caps. Plus, to prove its strength in numbers as well as words, Word 5.1 can graph numbers from a table in a variety of 3-D-chart formats.

Honorable Mentions

For those who'd rather forgo features to conserve space and memory, **LetterPerfect for Macintosh 2.1**, from WordPerfect, delivers a well-chosen set of basic features for low-end Macs and PowerBooks. The ruler is simple and uncluttered, the spelling checker and thesaurus are comprehensive, column creation is a breeze, and LetterPerfect easily recognizes and edits WordPerfect 2.1 files. For recognition of a different type, **Expervision's TypeReader for Macintosh 1.0** OCR software has a proprietary omnifont approach that produces impressive accuracy rates in recognizing a variety of fonts. Its interface is exceptionally well designed, with a comprehensive palette of tools that remains present at all stages of the OCR process.

Best New

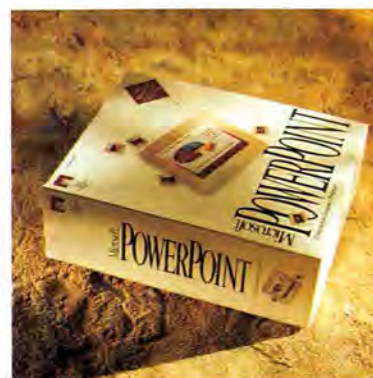
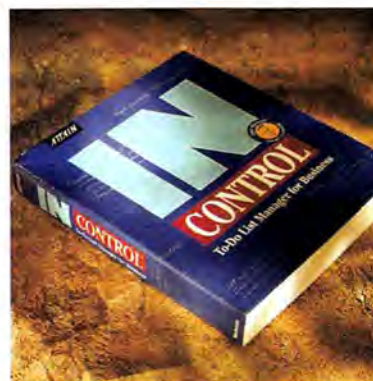
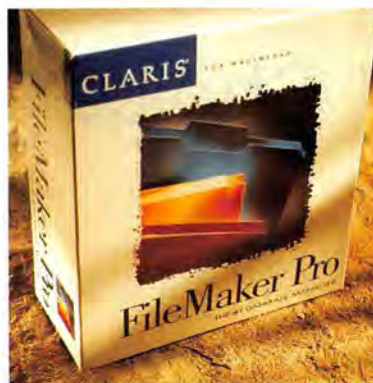
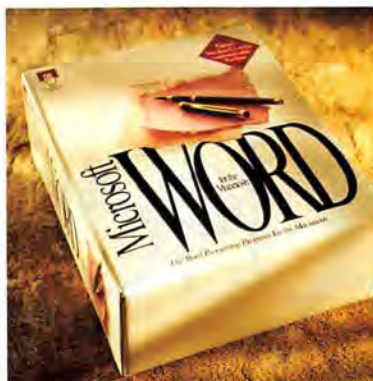
Business Productivity Program

FileMaker Pro 2.0

Claris' **FileMaker Pro 2.0** adds power and cross-platform compatibility to FileMaker Pro's long list of achievements. Using FileMaker's new scripting features, users with no prior programming experience can create scripts for automating nearly every FileMaker Pro function. And with FileMaker's AppleEvents support, you can also create scripts that control other programs — for example, generating an Excel chart from FileMaker Pro data. Claris' cross-platform compatibility is simply outstanding. The Windows version of FileMaker Pro looks virtually identical to the Mac original, and the two versions work together seamlessly, sharing data, layouts, and scripts.

Honorable Mentions

Microsoft's achievement in **Excel 4.0** is outstanding. In much less than a year, Microsoft significantly increased Excel's power and usability and introduced several spreadsheet innovations, including AutoFill, which automatically and intelligently fills a range of cells with a series; drag-and-drop data manipulation; and automatic range formatting. Symantec's **GreatWorks 2.0** was the



highest-rated integrated package released this year. With more modules than any of its competition, GreatWorks offers the biggest feature set of any Mac integrated package, including painting and outlining.

Best New

Organizational Tool

In Control 1.1

Simplicity and elegance are the hallmarks of Attain's **In Control 1.1**, the ultimate to-do-list manager. Essentially an outliner with columns, In Control offers the ability to define, select, and prioritize list items in a format that is almost instantly intuitive. By adding a select number of user-customizable shortcuts (such as auto-typing and pop-up-menu choices for frequently entered items) without complicating the interface, In Control makes it easy for you to manage your time, agenda, and personal projects.

Honorable Mentions

Now Up-To-Date 1.1 earns kudos for its ability to manage group schedules efficiently with minimal fuss and overhead. Its ability to mix private and public schedules enables workgroups to arrange meetings, book shared resources (such as conference rooms or audio-visual equipment), or manage project milestones with ease. **Inspiration 4.0** offers a dual environment that combines outlining and diagramming. Thanks to the seamless integration of the two modes, you can use one mode to brainstorm and generate ideas and shift to the other mode to evaluate and finalize them with a fresh perspective. Elegant touches for simple creation of and navigation through your inspirations abound.

Best New

Presentation Product

PowerPoint 3.0

Microsoft scores big again with **PowerPoint 3.0**. Rewritten from the ground up and chock-full of significant enhancements, PowerPoint 3.0 is an indispensable tool for creating professional-looking slide-based and on-screen business presentations quickly and easily. Noteworthy new features include a WYSIWYG outliner as well as a tool bar for quick access to commonly used commands. And PowerPoint really outclasses the competition in two key areas: It's the only presentation program to provide a built-in charting application, and for companies that want hassle-free exchange of presentations among Macs and PCs, PowerPoint's near-seamless compatibility between its Mac and Windows versions will be a major asset.

Honorable Mentions

DeltaPoint's **DeltaGraph Professional for Macintosh 2.02** is the Mac's top-notch business charting package, and it also doubles as an on-screen presentation tool. With the latest release, DeltaPoint has added a slide-show-presentation module to DeltaGraph Pro, so you can not only create a staggering variety of striking 2-D and 3-D charts but you

can also use them for presentations, complete with sound and transition effects. The latest release, **Persuasion 2.1**, of Aldus' veteran presentation program lets users enhance their on-screen presentations with QuickTime movies. The addition of a run-time player, 55 new AutoTemplates, and a variety of new background masters makes Persuasion a persuasive presentation package.

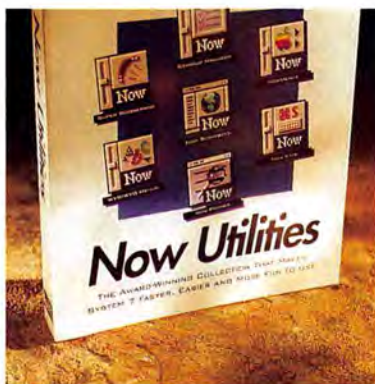
Best New

Financial Program **M.Y.O.B. 3.0**

You don't have to be an accountant to use Teleware's **M.Y.O.B. 3.0**, which may be one reason Apple is now bundling this small-business accounting package with the Performa 400 and 600. Despite its ease of use, M.Y.O.B. is a program of surprising depth that will grow with your company. Version 3.0 adds easier data importing, inventory building and back-ordering, and enhanced data analysis to its features list. M.Y.O.B. may not be able to help you with every last rule in your college accounting textbook, but no other small-business accounting package is this user-friendly.

Honorable Mentions

Accountant, Inc. MultiUser 3.5, from Softsync, brings you the power of multiuser accounting without the hefty price. With its fast new client/server database, version 3.5 gives everyone in the office timely access to



the important information they need. Fans of the popular atOnce! accounting program have eagerly awaited its latest incarnation as **Peachtree Accounting for Macintosh 2.0**. This significant upgrade adds bank reconciliation, inventory control, job costing, and purchase orders (among other features)—all for just \$99. Newcomers will appreciate the interactive tutorial and excellent on-line help.

Best New

Utility

Now Utilities 4.0.1

Last year's Best Utility winner just keeps getting better. With **Now Utilities 4.0.1**, Now Software's collection of seven file- and system-management tools for System 7 has become even more powerful. NowMenus lets you rearrange items on the Apple menu and create hot keys for any menu item; Super Boomerang can now search the contents of compressed files; Now Profile gives you instant detailed analysis of your system and its configuration; and a new feature called Now Scrapbook lets you organize, view, and store graphics, text, sounds, and QuickTime movies. If you're using System 7, you need Now Utilities 4.0.1.

Honorable Mentions

With **COPYright 1.0**, from CSG Technologies, copying files in the Finder doesn't keep your Macintosh tied up. Because COPYright operates in the background, you

John J. Anderson Distinguished Achievement Award

Susan Kare

No one better exemplifies what distinguishes the Mac from other computers than Susan Kare. With a doctorate in art history, she brought an artist's sensibility to a world that had been the exclusive domain of engineers and programmers and thus made the word *human* part of the phrase *interface design*.

A sculptor by training, Kare was recruited to the nascent Mac-development team by her former high-school classmate Andy Hertzfeld. Once at Apple, she took to the task of interface design, creating all the graphic elements that give the Mac its distinctive look. From the icons to the window designs to the original fonts—including Chicago, Geneva, and the notorious San Francisco—Susan Kare changed our expectations of how what we see on a computer screen should look and feel.

When Steve Jobs left Apple to found NeXT, she moved with him, becoming creative-services director and leading the development

of the graphic identity of that fledgling company.

In 1988 she founded her own interface-design firm and was soon doing work for Microsoft, designing the graphical-interface elements for Windows 3.0. Other clients include Farallon Computing, General Magic, Lightsource, Logitech, and Radius. Recently Kare contributed graphical elements to PowerPoint 3.0.

Susan Kare has changed how we work with computers on three platforms: Mac, Windows, and UNIX. At Apple she helped make personal computing truly personal for the first time; working with NeXT and Microsoft, she helped those companies provide competition that will ensure that Apple doesn't rest on the laurels she helped them earn. And thanks to her, computing is no longer a closed society of engineers and programmers but now belongs to tens of millions of users who know that the human element is the most important part of any interface.



MacUser Editors' Choice Awards

can undertake several copying jobs simultaneously or copy large files without disrupting your work flow. CE Software's QuickKeys is still the best way to create macros on your Mac. The new version, **QuickKeys 2.1.3**, adds extensions that automate tasks on your PowerBook as well as a totally revised version of Instant QuickKeys, the quick-and-easy way to create keyboard shortcuts for all of your Mac activities.

Best New

Protection Program Public Utilities 1.0

Everyone needs and should use a protection program. Add idiot-proof prevention as well, and you've got this year's Eddy winner. Fifth Generation Systems' **Public Utilities 1.0** is a two-part product: It offers a complete arsenal of recovery, undelete, and optimization tools and adds a behind-the-scenes scanner that can actually discover problems during idle time. You can opt to automatically fix problems as they occur or to receive an explanation of what the problem is, along with a proposed solution. Essentially geared toward beginners, the program has settings for advanced users as well.

Honorable Mentions

MacEKG II 2.05, from Micromat Computer Systems, is a funky little diagnostic program that's great for a fast daily report on your Mac's health. It doesn't fix problems, but it does alert you and give you a detailed report of what's wrong so you can fix it. Central Point Software's **MacTools 2.0** is a collection of utilities that offer data recovery, antivirus protection, and hard-disk backup.

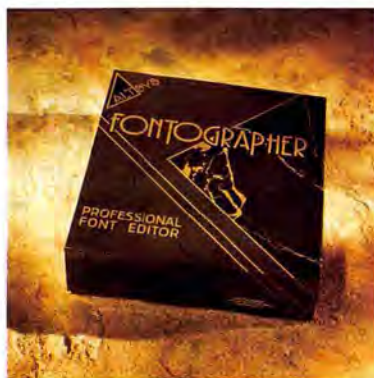
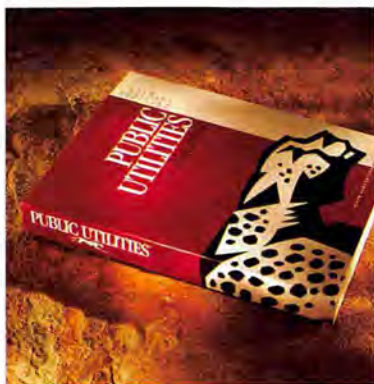
Best New

Portable-Computing Product CPU 1.0

When Apple brought out its notebook computers, two things were immediately apparent: PowerBooks could drain batteries much faster than Apple's estimates indicated they should, and Apple hadn't provided adequate controls for making power conservation easy. To the rescue came **CPU (Connectix PowerBook Utilities) 1.0**, a control-panel suite of PowerBook utilities that instantly became an essential tool for going on the road with a PowerBook. By providing different user-configurable settings for every aspect of power usage, CPU empowered PowerBook users to change their entire setup with a single menu selection.

Honorable Mentions

Global Village Communication's **PowerPort Gold**, the first internal V.32bis modem for the PowerBook, makes fast telecommunications as simple as plugging a phone line in to the back of a PowerBook. Whether you're sending a fax, accessing an on-line service, or using AppleTalk Remote Access at 14,400 bps, the PowerPort excels. Need to print on the road? The first choice has to be GCC's **WriteMove II**, a thermal-fusion



printer with 360-dpi output on plain paper. All with only 2.5 pounds of added weight.

Best New

Page-Design Program QuarkXPress 3.1

In a tight field, **QuarkXPress 3.1** further solidified QuarkXPress' reputation as a powerful page-layout program for professional designers. Quark packed several enhancements into version 3.1, including improved text controls for more-accurate kerning and alignment, new floating palettes, and increased layer controls. Solving one thorny problem, QuarkXPress can also apply trapping automatically. Also noteworthy is Quark's continued support for third-party developers, who can plug in to QuarkXPress' open architecture with QuarkXTensions.

Honorable Mentions

Aldus gave **PageMaker 4.2** several major new enhancements — adding a floating control palette that lets you precisely position and modify the size of items, introducing interruptible screen redraw, and bundling the program with PrePrint 1.51 for doing color separations. Above all, Aldus opened up PageMaker with Additions, modular components that extend the reach of the application. Aldus' Consumer Division addresses the low end of the page-layout market with **Personal Press 2.0**. This new version bolsters Personal Press' automatic features with intelligent templates, document monitoring, and copy fitting. Like its big brother PageMaker, Personal Press 2.0 added Additions technology this year.

Best New

Typographic Program Fontographer 3.5

Fontographer 3.5 addresses both the aesthetic and the technical aspects of type design, and the result is outstanding. Although Fontographer has long been a favored tool for professional and amateur designers alike, version 3.5 boasts two impressive new features: pressure sensitivity and multiple-master-font support. Now you can use Fontographer with a graphics tablet and a stylus, select from a variety of electronic-pen nibs, and vary pen pressure to create flowing calligraphic Type 1 or TrueType fonts. Altsys continues to be on the cutting edge: It gave Fontographer the ability to interpolate between designs and save them as multiple master fonts, which puts independent designers on an equal footing with Adobe.

Honorable Mentions

FontMonger, already useful for converting between font formats and creating custom keyboard maps, becomes an indispensable font utility in version 1.5. Ares Software adds the ability to import EPS graphics as fonts (and vice versa) and to edit font outlines, so you can tinker with a Mac or PC Type 1 or TrueType font and save it as your own. Adobe's first **multiple master typefaces** hit the market this year, and they were

worth the wait. Myriad Multiple Master and Minion Multiple Master revealed the potential of this technology for creating a multitude of fonts from well-crafted core designs.

Best New

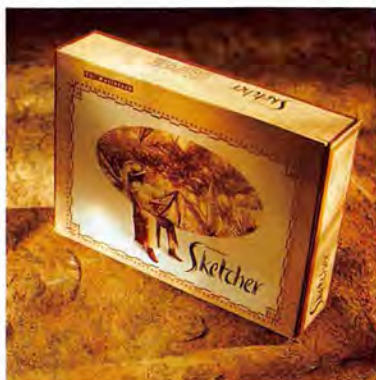
Graphics Program

Sketcher 1.0

Sketcher 1.0, from Fractal Design, integrates the natural media tools of its big brother Painter with the image-editing capabilities of the defunct ImageStudio to provide a low-cost gray-scale painting package. Sketcher offers neat features such as tear-off brushes, a new scratchboard tool, which lets you create white-on-black etched effects, and an outstanding emulation of a pressure pen with an ordinary mouse. Nonartists will appreciate the ability to turn any image into a Van Gogh-like vision of the world. At long last, laser-printer users have an inexpensive graphics program that caters to the often-neglected world of black-and-white output.

Honorable Mentions

Aldus' new **IntelliDraw 1.0** enters the crowded drawing market swinging, with an impressive array of features including intelligent linking of objects. Innovative tools such as the Connectigon and Symmetrigon offer casual users the power to create all manner of precise vector-oriented art while giving more-advanced users options that are unavailable in any other drawing package. Timeworks



Publishing brings users an updated **Color-It! 2.0**, which in some areas rivals Adobe's popular Photoshop. Powerful selection tools, new image-editing capabilities, and a myriad of painting options make this update a contender for the image-editing title at a fraction of the price of high-end programs.

Best New

Prepress Program

Cachet 1.0.1

In the year when What You See Is What You Get ceased to be a black-and-white proposition, **Cachet 1.0.1**, from Electronics for Imaging (EFI), stood out. With Cachet's simple but instructive edit-by-reference system, the stepwise-refinement approach of its MultiChoice feature, and its innovative device-independent color-management system, you'll get color-correct printed results every time. A gamut alarm indicates when you've introduced unprintable colors, scripts let you automate color correction, and sophisticated separation tools let you specify screen angle and dot shape. With Cachet, you can forget about expensive calibration and concentrate instead on the color of your creations.

Honorable Mentions

ColorAccess 1.3 wins votes of the color cognoscenti for its sophisticated interactive control of white points, black points, and the whole spectrum in between. Barneyscan wisely unbundled the popular software from

Derek Van Alstyne Rising Star Award

Robert Slimbach and Carol Twombly

You've seen their faces everywhere, on bus-shelter billboards, in America's leading newspapers, on wine bottles, on MTV. If their photograph doesn't ring a bell, that's not surprising. The faces you've seen are typefaces they've designed. As principal type designers for Adobe Systems, Robert Slimbach and Carol Twombly are responsible for some of the most appealing fonts available on the Macintosh today — fonts such as Slimbach's Utopia and Minion and Twombly's Charlemagne, Trajan, and the ubiquitous Lithos. They've also designed revivals in the Adobe Originals program, such as Adobe Garamond and Adobe Caslon, respectively.

Individually, their achievements are impressive. But last year they jointly produced their biggest challenge: Myriad Multiple Master, the first multiple master typeface. In creating Myriad, which draws on a core design that can be widely altered to suit a variety of needs, they pushed the aesthetic and

technological envelope. The elegant simplicity of Myriad masks complex software.

Before coming to Adobe in 1987, Slimbach drew fonts at Autologic. His training as a calligrapher is apparent in his stunning new design Poetica; he also created the multiple-master version of Minion.

Twombly's interest in type was sparked while Twombly was a student at the Rhode Island School of Design.

She then traveled west to study digital typography at Stanford University before joining Adobe in 1988.

In the tradition-bound world of type design, Robert Slimbach and Carol Twombly are fresh faces. And in the brave new world of the Macintosh, they stand for careful craftsmanship. Through their efforts, the way we see type and how we use our Macintoshes have changed. As any Lithos-using administrative assistant can tell you, type isn't just for graphic artists anymore.



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its scanners to make it accessible to everyone. By letting you arrange pages for a printing press, Aldus **PressWise 1.0** fills the gap for digital imposition long felt by desktop publishers of books, catalogs, and newsletters. Featuring a friendly interface and powerful features, PressWise is a cost-cutting alternative to expensive film stripping.

Best New

Graphics/Publishing Utility **deBabelizer 1.2.15**

deBabelizer 1.2.15, from Equilibrium Technologies, is the polyglot of bit-map-file conversion. This indispensable utility allows painters, animators, video artists, and service-bureau operators to convert art created on any platform, from the ancient Commodore 64 to a Sun workstation, into a variety of Mac formats. Its robust scripting capabilities and outstanding batch processing enable deBabelizer to convert a hard disk full of files while unattended. Powerful scaling tools, color-palette adjustments, and Photoshop plug-in compatibility make deBabelizer more than a conversion utility.

Honorable Mentions

Smoothie 1.02, from Peirce Software, gives you the power to look your best on-screen. With the ability to smooth any vector-based PICT, support for full publish-and-subscribe, and the option of a slide-show feature, Smoothie is a powerful program for business professionals doing on-screen presentations. **TextureSynth 1.12**, from Pantech-nicon, lets you generate textures based on nine variables with the push of a button. Those needing an interesting background for a presentation or a cool texture for 3-D artwork will find this tool valuable.

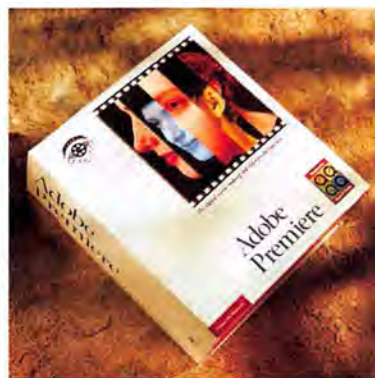
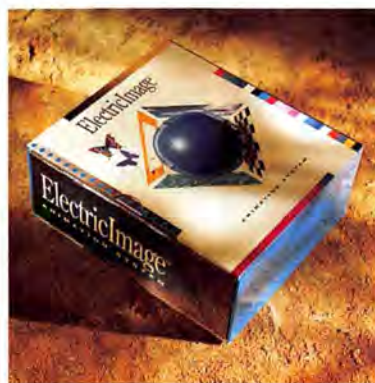
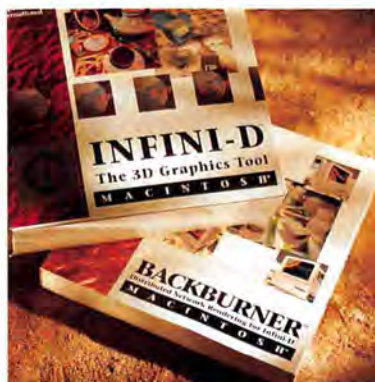
Best New

3-D Program **Infini-D 2.0**

In **Infini-D 2.0**, a host of new features takes Specular International's Infini-D from last year's honorable mention in the rendering-program category to this year's best 3-D program. The Swiss-army knife of 3-D, Infini-D 2.0 adds the unique feature of EPS-outline subscribe: When you edit an original 2-D EPS file, Infini-D automatically updates its 3-D cousin. Enhanced rendering capabilities, multiple surface maps, and whizzy special effects make Infini-D an outstanding value. When the product is coupled with Specular International's network renderer, BackBurner, Infini-D users get the power of parallel processing in an easy-to-use, well-engineered application.

Honorable Mentions

Macromedia's **MacroModel 1.0** rolls awesome 3-D modeling into an easy-to-use package. Near-real-time shaded views, CAD accuracy, and a great interface combine to make this newest entry into the 3-D arena a must-have for power users. **Sketch! 1.5**, from Alias Research, brings high-end technology such



as NURBS (nonuniform rational B-splines) to the Mac. The unique Match Backdrop feature gives artists the ability to integrate 3-D art into almost any photograph. Artists will find Sketch!'s curvy, organic surfaces seductively inviting.

Best New

Animation Program **ElectricImage Animation System 1.5**

Broadcast-quality 3-D animation comes to the Mac with **ElectricImage Animation System 1.5**. Precise numerical control of animation and special effects make this the program of choice for professional animators. Excellent texture mapping and font beveling combined with fast rendering made it last year's runner-up in this category. The addition of shadow casting, enhanced transparency controls, and an all-new manual push this application to the top of the heap. For \$7,495, you do get what you pay for.

Honorable Mentions

Macromedia's **MacroMind Director 3.1** is more than just a sophisticated animation application. Its ability to combine sound, video images, and animations, together with its robust scripting capabilities, make it a superior authoring program. **Cinemation 1.0**'s superb interface and full feature set make it easy to create anything from simple animations to complex, interactive presentations. Vividus includes a huge selection of clip animations and clip audio with the program and provides excellent documentation.

Best New

Desktop-Video Product **Premiere 2.0**

Premiere 2.0, from Adobe Systems, is rapidly becoming the watershed software for digital-video and multimedia pioneers. With its ability to support both on-line and off-line editing and the inclusion of Adobe's plug-in architecture, Premiere 2.0 is in a league of its own. Accessible to novices and professionals alike, version 2.0 supports SMPTE time code, exports industry-standard edit-decision lists, and permits basic rotoscoping for adding effects to frames in applications such as Photoshop. Whether you're looking to construct small QuickTime segments to include in your presentations or edit high-quality video images and print them to tape for distribution, there is no better program than Premiere 2.0 for accomplishing the task.

Honorable Mentions

Digital F/X's **Video F/X Plus** allows Mac-savvy creative teams to construct finished broadcast-quality video from start to finish. With this \$15,995 hardware/software product suite, you can edit off-line and print a compatible edit-decision list, or edit online and print the finished video project to tape. SuperMac's **VideoSpigot NuBus** card is a powerful tool offered at an almost-toy price. Bundled with Adobe Systems' Premiere, it

equips you with a complete video-digitizing and -editing product for less than \$450.

Best Deal

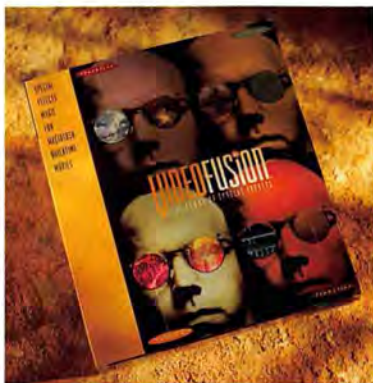
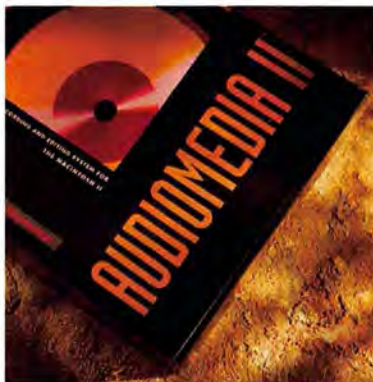
Multimedia/Sound Product

Audiomedia II

Digidesign has done it again with **Audiomedia II**, a DSP-based NuBus card for CD-quality, direct-to-disk stereo recording and playback. This second-generation Audiomedia card features higher-quality sound capture plus digital input and output for use with DAT (digital audiotape). Audiomedia II includes the excellent Sound Designer II software, which offers such professional tools as SMPTE synchronization, nondestructive playlist editing, pitch shift with time correction, and a host of other features. Digidesign's Audiomedia II will soothe the soul of even the most savage audio engineer.

Honorable Mentions

Presentations shine when they're created in Macromedia's **Action! 1.0**. Action! offers a wide range of multimedia features that are powerful, easy to use, and guaranteed to impress any audience. Presentation Templates get you up and running in minutes. **Songworks 1.1**, from Ars Nova, makes it easy to write songs and even easier to learn about music. Just enter a few musical ideas by moving your mouse along an on-screen piano keyboard, and a notated version of the performance instantly appears. Songworks



even offers instant harmonies to fit your melodies or melodies to fit your harmonies.

Best Deal

Special Effects

VideoFusion 1.0

VideoFusion 1.0 defines the world of QuickTime image processing and special effects. This powerhouse program offers tools for editing QuickTime movies and boasts an overwhelming number of dynamic filters, including a dizzying array of image-processing options: warping, convolution, pan/zoom/rotate transformations, and other filters that can be customized for maximum creative control. VideoFusion even gives you channel separation, sound support, and the ability to metamorphose (morph) from one image to another — all in one elegant package.

Honorable Mentions

Gryphon Software's impressive **Morph 1.0** lets you take several images and metamorphose (morph) one image into the other and record the transformation as a QuickTime movie. With Morph, Yeltsin becomes Bush becomes Clinton becomes Princess Di. Gryphon offers this year's favorite special effect at an outrageously low (\$99) street price. Pixar's **Typstry 1.0** offers stunning 3-D text effects at a remarkably low price. Typstry transforms any text string into 3-D type. You can apply looks from Pixar's extensive texture library and animate the results

Software Product of the Year

Cachet 1.0.1

It's such a simple concept, really, but no one had quite figured out how to make it work. Then Electronics for Imaging (EFI) developed Cachet, and the way we approach color on the Macintosh may never be the same again.

The thrust of Cachet, EFI's image-editing software, is that making color accessible to the masses means putting it in terms anyone can understand. Forget RGB, CMYK, HSV, CIEXYZ — just make it possible to look at an image and say, "I want it to look like *that*" and make it so.

Cachet's edit-by-reference approach does just that. You compare your image to a digital representation of a preprinted reference image (which you've chosen because it has similar characteristics, such as skin tones or lighting). The program presents you with six alternatives, based on the quality you'd like to correct.

You pick the image that looks best to you, and Cachet does the

rest, applying the correct settings to your image. You can scroll through endless sets of alternatives until you get just the right balance of exposure, contrast, saturation, and so on. With Cachet, you can be sure that as long as your on-screen image looks like the reference image, you'll get expert-looking results, even if you're not a color expert.

But Cachet doesn't stop there. Its underlying technology, EfiColor, ensures that the colors you create on-screen can be printed on a variety of paper stocks and output devices. The result is pleasing, predictable color for novices and veterans alike.

EFI was established by Efi Arazi, the founder of Scitex, to bring high-end color capabilities to personal computers. Now his goal may soon be realized. With Apple integrating color management at the system level with ColorSync, 1993 may finally be the year of color, and Cachet is leading the way.



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to create dazzling flying logos. Typestry also provides a slew of lighting effects such as colored lights, gels, and shadow casting.

Best New

Input Device

PowerPad

For number-crunching executives on the road, Sophisticated Circuits offers the **PowerPad**, a portable numeric and function keypad for PowerBooks. The PowerPad's ergonomic design and tactile keys help to improve overall keystroke accuracy and reduce fatigue. The PowerPad comes with 10Key Tape, a DA that lets you store, edit, and print your calculations, and ModifierKeys, a software patch that lets you use common keyboard command equivalents. This well-designed external keypad also comes with a pass-through ADB port for additional peripherals such as modems and other input devices.

Honorable Mentions

The CalComp **DrawingPad** is a digitizing tablet that brings you as close as it gets to drawing on paper with a pencil — complete with 256 levels of pressure sensitivity and a pen with two programmable buttons. The **Turbo Mouse 4.0**, from Kensington, is an optical trackball that allows smooth cursor tracking and control. Outstanding cursor movement, comfortable design, and powerful software make this one of the best trackball devices for the Mac.

Best New

Scanning Product

Arcus

Need speedy scans of flat or reflective art? Agfa's **Arcus** comes to the rescue. With true 600-dpi resolution and 10-bit-per-pixel color, this one-pass scanner possesses a winning combination of quality and efficiency. Other features include 10-bit gray-scale sampling and software interpolation to 1,200 dpi for line-art images. Arcus offers automatic exposure control for easy one-touch scanning and provides calibration tools of particular interest to discerning professionals.

Honorable Mentions

With a resolution of 2,700 dpi and a price of \$2,695, the **mira•35**, from Santos Technology, offers dollar-a-dot scanning of slides or negatives. The mira•35 captures 10 bits of information per color in a single pass, providing fast scans and a small footprint in an attractively designed package. The **Polaroid CS-500 Digital Photo Scanner** scans images as large as 4 x 6 inches in 24-bit color at 500 dpi. Perfect for scanning snapshots for image databases, the CS-500 includes image sharpening, contrast correction, color calibration, and color-balance settings.

Best New

Display Product

Luminator LCD Projector

When you need to present your ideas on a big screen, the **Luminator LCD Projector**,



from nView, can't be beat. A projection system that attaches to your Macintosh or VCR, the Luminator has an active-matrix LCD design that offers fast response and excellent color without the extra weight and alignment hassles of a traditional three-gun CRT system. The Luminator features a user-changeable 400-watt arc lamp that produces a bright image as large as 12 feet diagonally and lasts 250 hours. Top-mounted, backlit controls let you select video sources (you can connect as many as four simultaneously) and adjust speaker volume, brightness, contrast, and color settings. Bid farewell to overheads and slide projectors.

Honorable Mentions

E-Machines' **ColorLink** cards combine Ethernet connectivity and accelerated graphics on a single multifunction card. Available for 12- through 17-inch monitors at 8- or 24-bit color and for 19-inch monitors at 8-bit color, the ColorLink family gives one-slot machines the best of both worlds and frees slots on multislot Macintoshes. For those who are shopping for a new monitor and don't mind spending more for the best, no 17-inch color monitor will match the crisp graphics and easy system integration of the Nanao **FLEXSCAN T560i**. The FLEXSCAN's anti-static, antireflective screen coating offers excellent glare protection under even the harshest lighting.

Best New

Monochrome Printer

LaserJet 4M

Hewlett-Packard's **LaserJet 4M** sets a new standard for laser-printer quality and performance. At 600 dpi, the 4M has four times the resolution of a 300-dpi printer but offers speeds comparable to those of its lower-resolution cousins, thanks to its RISC processor. HP's proprietary Resolution Enhancement Technique and Microfine toner further improve the quality of text and line art. This 8-ppm printer also sports Adobe PostScript Level 2. Quality and performance meet on an equal level in the 4M — for a street price of less than \$2,000.

Honorable Mentions

Two tabloid-sized printers stood out in 1992. Driven by a 25-megahertz RISC processor, the **QMS 860 Hammerhead Print System** offers 600-dpi resolution for printing crisp, clear text and good image detail. Coupled with QMS' Crown Architecture for printing in shared environments, the 860 provides fast processing speed and printer performance while maintaining outstanding print quality on 11-x-17-inch paper. With its resolution of 1,800-x-900 dpi, the **Du Pont PPI 1800**, from Du Pont Imaging Systems, prints superior, near-imagesetter-quality documents on plain, tabloid-sized paper. Standard with 16 megabytes of RAM, a 105-megabyte hard drive, and a \$25,000 price tag, the PPI 1800 produces the highest-quality monochrome laser-printer output to date.

Best New

Color Printer

Kodak XLT 7720

Rivalling the quality of traditional photographs, output from the **Kodak XLT 7720** digital continuous-tone printer surpasses that from other dye-sublimation printers. The tonal quality and color richness of prints and transparencies from this premium-priced (\$24,895) printer are nothing short of phenomenal. Designed in part with an eye toward digital photography, the XLT 7720 is an excellent choice for photo imaging, business presentations, and other applications in which true colors and photo-realistic output are required. The printer comes with a variety of drivers to meet specific user needs. Quality color on the desktop takes a big step forward.

Honorable Mentions

Hewlett-Packard makes color affordable with the **PaintJet XL300** inkjet color printer. With four ink colors and Adobe PostScript Level 2, this printer is a good choice for anyone doing desktop publishing to color spreadsheets. The **Phaser IIsd** dye-sublimation printer, from Tektronix, introduces affordable quality color to the desktop. The advantages of Adobe PostScript Level 2, practical color adjustments through TekColor, fine lines and text made possible with Photofine technology, and a \$9,995 price tag put the IIsd a notch above comparable printers.



Best New

Accelerator Board

TokaMac II FX 33

The **TokaMac II FX 33**, from Fusion Data Systems, transforms the Mac IIx into the "wicked-fast" Mac of 1992 yet maintains excellent hardware and software compatibility. Its combined PDS and NuBus design, which employs cached writes and block transfers to accelerate graphics displays, and its 128K of second-level cache keep this 33-megahertz 68040 upgrade running faster than a Quadra 950.

Honorable Mentions

The **FastCache Quadra**, from DayStar, represents an excellent price/performance value. With 128K of static RAM, using this cache card is a simple and inexpensive way to accelerate members of the Mac Quadra family. **ThunderStorm**, from SuperMac, ushers in a new era of application-specific acceleration products. As a DSP (digital-signal processing) board that replaces several of Adobe Photoshop's native effects filters, ThunderStorm enables Photoshop users to reach new levels of productivity.

Best New

Storage Product

DSP 3105

Although the actual drive mechanism isn't the only key factor to consider when choosing a hard drive, it remains the foundation on

Hardware Product of the Year

VideoSpigot

You say you want a revolution? In the year when the much-anticipated desktop-video revolution finally exploded, SuperMac's VideoSpigot cards played a key role. In fact, VideoSpigot is to desktop video what the original LaserWriter was to desktop publishing.

If the goal of Apple's QuickTime was low-cost, easy-to-use video for the masses, then expensive hardware and poor-quality images would have stopped progress dead in its tracks. After all, you'll recall that just about everything written or said about the first generation of QuickTime products referred to their output as jerky postage-stamp-sized images.

That's where the VideoSpigot comes in. The VideoSpigot allows you to record smooth, 30-frame-per-second video to disk from your VCR, video camera, or laserdisc player. The video window is small, but the images are clean.

The VideoSpigot comes complete with easy-to-use digitizing software and various flavors of

Adobe's powerful Premiere QuickTime-editing application as well. Just plug in the VideoSpigot board, drop an extension into your System Folder, and restart, and you're ready to make QuickTime movies.

And SuperMac made the VideoSpigot accessible and affordable: Cards are available for the Macintosh IIx and LC as well as for beefier machines that use NuBus cards, and the product hit the street priced at less than

\$600, which SuperMac has already cut to less than \$450. Think of it: You can have a complete video-digitizing and -editing package for what amounts to peanuts.

Educators, creative departments, video professionals, multimedia developers, and even home users have been eagerly snatching up VideoSpigots, because of their incredibly low price, the high quality of their output, and the ease with which they allow users to create, edit, and integrate moving images. We're ready when you are, Mr. deMille.



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which all else must rest. Digital Equipment's **DSP 3105** 1-gigabyte drive mechanism has raised that foundation to a new level. By implementing a large, sophisticated cache that is powered by its own on-board microprocessor, Digital has created a drive mechanism that responds well to the way most applications deal with storage devices. High capacity, high performance, and robust design make this a dream drive mechanism for most Mac users. Its low cost makes it a reality. Look for it in drives from FWB, PLI, Storage Dimensions, MicroNet, and others.

Honorable Mentions

The **MacinStor SpeedArray** family, from Storage Dimensions, brings the well-constructed storage subsystems for which Storage Dimensions is famous together with state-of-the-art disk array technology. The SCSI-2 Wide SpeedArray is the fastest array for the Mac that we've tested. The **Inspire II** optical drives, from Alphatronix, offer ISO compatibility with enhanced error-detection features. The Inspire II drives' lighter split-optics technology and twin data channels give them higher performance than other optical drives.

Best Deal

Communications Product

PowerPort Gold

Global Village Communication's **PowerPort Gold** modem, our top pick in the PowerPort series, was one of the first high-speed communications products for the Mac PowerBook, and it's still the best. The PowerPort's support for ARA (AppleTalk Remote Access), last year's Eddy Award-winner in this category, makes it de rigueur for any PowerBook-toting traveler or telecommuter. The PowerPort Gold also comes with Global Village's easy-to-use fax software, which makes sending faxes as easy as printing. For those on the road, a PowerPort-equipped PowerBook can also serve as a mobile fax receiver, transforming a PowerBook into a complete mobile office machine.

Honorable Mentions

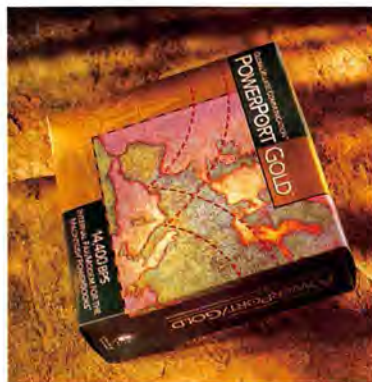
Cypress Research's **PhonePro 1.0** is an innovative software/hardware combination for creating Mac-based voice-mail applications. With its iconic "language," PhonePro lets you easily build elaborate setups to handle incoming phone calls and route them, take messages, or accept touch-tone input. If you want to build the perfect answering machine, PhonePro's the way to go. Hayes' **SmartCom II for the Macintosh 3.4** is a good example of easy-to-use telecommunications software. It makes good use of color and icons, putting a friendly face on an environment that's often frustrating to novices; provides many popular terminal emulations; and supports all the popular file-transfer protocols.

Best Deal

Network/Connectivity Hardware

LanRover/L

The **LanRover/L**, from Shiva, was the



first dedicated hardware device to provide dial-in access to AppleTalk networks, using Apple's ARA (AppleTalk Remote Access) client software. As PowerBooks, telecommuting, and bulletin-board activity have proliferated, the LanRover/L has added significant value to ARA: It removes the need to allocate a Mac as a server for remote dial-in or shared dial-out. Connected directly to a LocalTalk network and any ARA-compatible modem, the LanRover/L provides such useful features as centralized management, security, and user callback.

Honorable Mentions

The **AsantéHub 1012**, a 12-port, intelligent 10BASE-T Ethernet hub, sports an inventive design that provides easy-to-read troubleshooting information. Along with the hardware, Asanté provides Mac and Windows versions of its SNMP-compliant in-band and out-of-band management software. International Transware's **EtherWay EL** is a cost-effective AppleTalk-only router that's so easy to install even networking novices can do it. Featuring plug-and-play functionality, the EtherWay EL configures itself when connecting a LocalTalk network to an Ethernet network. It's ideal for small networks looking to expand into the Ethernet market.

Best Deal

Network/Connectivity Software

cc:Mail for Macintosh 2.0

Lotus Development's **cc:Mail for Macintosh 2.0** combines a colorful, streamlined interface with innovative Mac-to-PC features to make an easy-to-use communication tool. Its unique file-server architecture eliminates the need to use gateways for exchanging messages between differing platforms. Document sharers will love the automatic translation and viewing of both Mac and PC enclosures that is made possible by Apple's XTND technology, and the ability to launch applications from within cc:Mail by double-clicking on enclosures. Flexible addressing, a Find command that searches all messages by subject or contents, and other new features make cc:Mail a powerful cross-platform mail package.

Honorable Mentions

Dayna Communications' **Network Vital Signs 1.0** performs comprehensive network-fault monitoring while running in the background. When something unexpected happens to your mission-critical network devices, the program notifies you before your users do. Managers using Network Vital Signs can compile detailed information about network performance over time to help them understand their own networks' vital signs. Trik's **NetDistributor Pro 1.0.1** makes fast work of the time-intensive task of distributing software updates to Macs on a network. Network administrators can use NetDistributor's highly intuitive visual-scripting functionality to easily automate procedures for updating existing files, deleting obsolete files, or installing new ones.

Best New

Compression Product **StuffIt Deluxe 3.0**

Aladdin Systems' **StuffIt Deluxe 3.0** is a complete compression system for all Mac users. It provides background compression, translation to and from innumerable other Mac and non-Mac compression formats, and a plethora of utilities that make compressing and decompressing with StuffIt a snap. Anyone who needs compression tools on the Mac for space saving, archiving, or telecommunications should have this package. Period.

Honorable Mentions

PicturePress 2.5, Storm Technology's JPEG compression system, introduces several new features to an already-excellent package. In addition to providing faster JPEG algorithms, both for its DSP hardware and in its software, PicturePress makes it easy to process large numbers of files with the help of a UserLand-Frontier-based "agent." If you want to make JPEG part of your production flow, PicturePress 2.5 fits the bill. Golden Triangle's **TimesTwo 1.0** is the first driver-level Macintosh compression product: Install the software, and your hard disk grows to roughly twice its size. For PowerBook users with small drives as well as for those with too-small drives and too-small pocketbooks, TimesTwo offers a larger hard disk at an affordable price.



Best New

Development Tool **Frontier 2.0**

UserLand's **Frontier 2.0** scripting environment forges the way for the next generation of Macintosh software: user-scriptable applications. Developers and power users who have been waiting for Apple's own AppleScript scripting system to become available can automate many of their Mac tasks today, using Frontier. Version 2.0's new run-time module and many other new tools make Frontier accessible to non-script-writing users as well.

Honorable Mentions

Language Systems' **SoftPolish 1.1** is a novel tool that handles much of the drudgery of readying software for final shipment. It checks compliance with many Apple-defined guidelines, spell-checks software's text messages, and verifies that many easily overlooked details are not ignored. A must for anyone who is interested in shipping high-quality software. Apple's **Macintosh Common Lisp 2.0** is an exemplary development environment that lets Mac users build applications quickly and incrementally. What's more, because the product ships on a CD-ROM, Apple is able to include more sample source code with Macintosh Common Lisp than ships with any other development system available today.

Breakthrough Technology of the Year

PowerBook Duo System

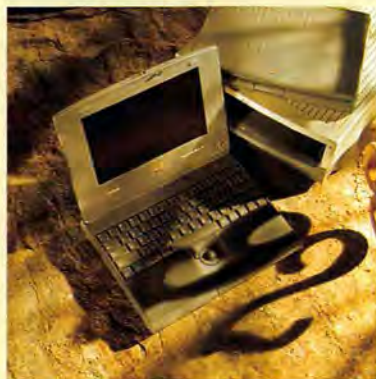
Apple didn't invent the concept of the dockable notebook computer, but it's the first company to do it right. The Duo Dock, the base unit to which the PowerBook 210 and 230 can be docked, is much more than a plastic box that connects cables to a notebook and supports the weight of a monitor (if that's what you're looking for, though, any number of Intel-based vendors can oblige you). The Duo Dock features a floppy-disk drive, its own VRAM and I/O circuitry, and an innovative technology called PowerLatch.

When you insert a PowerBook Duo machine into the Duo Dock, the PowerLatch draws the notebook in mechanically, as if you were putting a tape into a VCR. This guarantees proper positioning and makes possible several intelligent functions. For example, if you eject the PowerBook while you have an application open, the Duo Dock system interprets the command as a shutdown and asks whether you want to save your

work first. Similarly, if you eject the PowerBook while you're connected to a server, the system will automatically log you back on the next time you insert the PowerBook into the dock. Look for this intelligent handling of networks to migrate to all of Apple's notebook machines soon.

The Duo System's innovations in hardware, system-level software, and industrial design add up to a breakthrough that may well mark the

beginning of the end of the era of stationary computing. The Duo System goes a long way toward making it practical to adopt a single-machine solution for both the home and the road. Apple has designed the Duo Dock system to work with the smallest, lightest, and fastest portable computers the company has ever built. For a price that's comparable to that of setting up a stand-alone desktop system, it's now possible to add leading-edge portable technology without sacrificing performance.



MacUser Editors' Choice Awards

Best New

Science/Engineering Product

StatView 4.0

You don't have to be a statistician to take advantage of **StatView 4.0's** powerful data-analysis and presentation features. Abacus completely rewrote StatView to make it easier than ever to turn piles of numbers into meaningful pictures. In addition to 150 functions and transformations, StatView 4.0 offers an improved interface, including floating windows that give hints on how to proceed with your analysis. You can also recycle your work by turning your document into a template for analyzing new sets of data. A time-saving feature lets you place the results of multiple analyses into a single analysis document. New presentation and drawing tools enable you to create a complete slide presentation from within the program.

Honorable Mentions

MiniCAD+ 4's practical features, such as a database linked to parts for creating reports and cost estimates, made this Graphsoft precision-CAD program a previous Eddy Award winner. Features new in MiniCAD+ 4 include Bézier splines and 3-D tools such as automatic wall, roof, and floor creators as well as the ability to create 3-D fly-throughs of flat rendered models. Statistics powerhouse **Systat 5.2** now offers the most complete implementation of the multivariate general linear model available for the Macintosh. New to version 5.2 are statistical routines such as hypothesis testing, an improved interface that requires fewer mouse clicks, and performance improvements. Systat's new QuickTime support lets you animate plots of data over time.

Best New

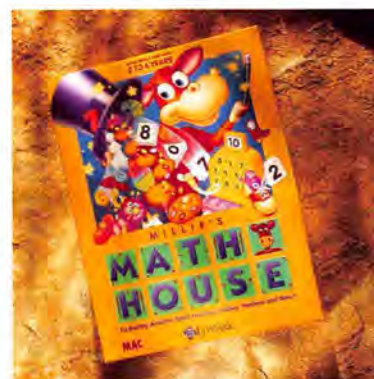
Information Resource

Expanded Books

Electronic books were envisioned many years ago by hypertext pioneer Ted Nelson. But just as da Vinci's flying machines had to wait for the internal-combustion engine, Nelson's dream required the PowerBook — and the talents of The Voyager Company — before it could be realized in the form of **Expanded Books**. What sets this series apart is not just the simplicity and elegance of the format but also the wide range of contemporary and classic titles that are included in the series. Great literature no longer comes on paper alone.

Honorable Mentions

Our shelves groaned with hefty new Mac books this year, but **The Macintosh Bible**, now in its fourth edition from Goldstein and Blair and distributed by Peachpit Press, is still the heftiest of them all. What enables the *Bible* to live up to its name is the cumulative wealth of Macintosh wisdom from its many contributors. The book's accompanying disks are stuffed with 3 megabytes of shareware. For literal rather than literary wealth, **WealthBuilder 2.0** is the hands-on investor's



best friend. By providing easy and affordable access to on-line financial data, **WealthBuilder**, from Reality Technologies, makes it possible for users to act as their own financial planners.

Best New

Visual Resource

Tree 1.0

As its name implies, **Onyx Computing's Tree 1.0** is an unusual little application that makes trees — lots of them, with all manner of variations on leaf, twig, and bough. You set your parameters and watch a magnolia or silver birch sprout on your screen. Save it as a PICT file to incorporate into presentations, landscape designs, or publications. The only Eddy Award winner to have a Phylloclad menu, **Tree** proves that mighty products from little ideas grow.

Honorable Mentions

Richly grained marble from quarries around the world forms the basis of **Artbeats' Marble & Granite 1.0**. Mine this two-CD collection for background textures to use in multimedia and publishing. 21st Century Media's **PhotoDisc** series on CD-ROM offers Mac users full-color photographs in a broad range of subjects. Its **LightBox** software lets you preview thumbnails of complete image catalogs.

Best New

Children's Program

Millie's Math House

Millie's Math House, from Edmark, is everything a kid's educational program should be: colorful, engaging, and just plain fun. Each of the program's six wacky activities is filled with friendly characters — Arnie the Worm, Frank Lloyd Mouse, Harley the Horse — that challenge young users to explore patterns, numbers, and shapes or to join in on entertaining games where winning is fun and incorrect answers are gently corrected. An extensive Adult mode provides educational tips, child-development information, and an unobtrusive tracking system for keeping tabs on the usage patterns of a whole classroom full of kids.

Honorable Mentions

The first two installments in **Brøderbund Software's Living Books series**, *Just Grandma and Me* and *Arthur's Teacher Trouble*, are stunning examples of how elegant and entertaining multimedia products can be. Children can click their way through richly animated CD-ROM retellings of these two popular children's books, where starfish dance, cookies sing doo-wop tunes, and clouds transform themselves into tugboats and teddy bears. In **Word Tales**, from Warner New Media, a hip young alien named Milo leads children through an alphabet full of vocabulary building — complete with witty animations and up-tempo tunes — and a challenging arcade game that comes as a reward for word mastery.

Best New

Education Program

Interactive Physics II 1.01

Physics comes to life with Knowledge Revolution's **Interactive Physics II 1.01**. This upgrade has a new simulation engine and custom authoring tools that help teachers teach better and students learn more easily. A complete motion lab, *Interactive Physics II* enables users to create experiments by drawing and building objects. The simulation engine shows the results through the use of animation. The program helps students understand formulas through visualization and interactive learning.

Honorable Mentions

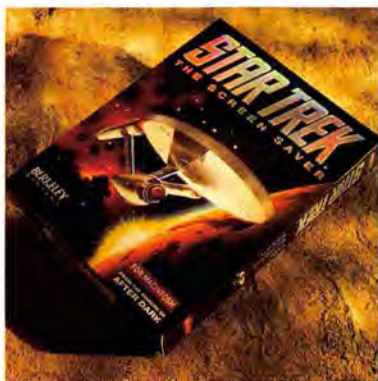
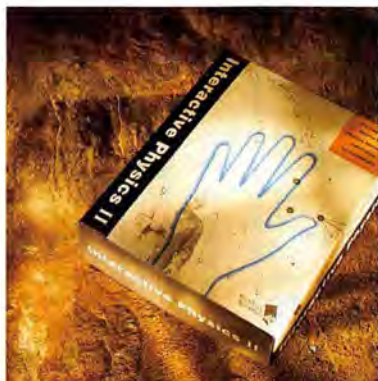
In a new twist on desktop publishing, The Voyager Company's **Expanded Book Toolkit 1.0** lets you create on-screen books by importing text from almost any word-processing program and then adding sound, graphics, and video. The impact on education is far-reaching: Teachers can tailor curricula, and students can customize reports. Learn about the Romantic period with The Voyager Company's CD companion, **Richard Strauss: Three Tone Poems**. The nine-part program lets you explore the brilliance of Strauss' masterpieces, *Don Juan*, *Till Eulenspiegel*, and *Death and Transfiguration*. Learn about the music, the historical era, and the instruments by navigating your way through the pieces, and then test your knowledge by playing the Prankster's game.

Best New

Game

Prince of Persia 1.0

Brøderbund Software's **Prince of Persia** puts new flavor into the old theme of the video-game damsel in distress. The terrible Grand Vizier Jaffar has claimed the throne of the land and plans to marry the princess, who is in love with your character. The dangerous challenge is up to you: Rescue the princess and save the kingdom. You must journey through the Grand Vizier's castle and its 12 dungeon levels, avoiding deadly traps, gathering magical charms and potions, and battling Jaffar's men, who are determined to



stop you. Brøderbund spices it up with great graphics and sound.

Honorable Mentions

In **Diamonds 2.0**, a fast-paced arcade-style game from Varcon Systems, the player must guide a moving ball through 30 mazes, clearing bricks to advance. It's one of the most addictive games since Crystal Quest. In ICOM Simulations' CD-ROM **Sherlock Holmes, Consulting Detective, Volume 1** — the most photo-realistic interactive computer game yet — the player is faced with three murder cases that involve jealousy, greed, power, and even the curse of a 4,000-year-old mummy.

Best New

Desktop Diversion

Star Trek: The Screen Saver 1.0

From the people who brought you flying toasters comes **Star Trek: The Screen Saver 1.0**. Based on the original "Star Trek" television series, the screen saver brings Captain Kirk and the crew of the USS *Enterprise* to life on your computer screen. Monitor Bones McCoy's sick-bay report, view Scotty's blueprints of the *Enterprise*, listen to Spock strum his Vulcan lyrette and sing, and more. For the serious Trekkie, there's even a final exam to test your knowledge of the show. If you don't already have Berkeley Systems' *After Dark*, *Star Trek: The Screen Saver* works as a stand-alone product. Because it's a screen saver — designed to prevent monitor burn-in — you might get your company to pop for it.

Honorable Mentions

Funny: The Movie in QuickTime, from Warner New Media, is a CD-ROM collection of 100 jokes, including stories, riddles, and sight gags. You can watch these jokes — told by the famous and the not-so-famous — as a movie, search for specific laughs, or turn the jokes into screen savers with the included *After Dark* module. **Insanity 1.0**, from UV Wave, literally lets you take your frustrations out on your Mac. Riddle your screen with bullets from an Uzi or a .44 Magnum — complete with gory visuals and realistic sound effects. Shoot Bill out of a cannon and splatter his remains onto your screen. Offensive to some, perhaps, but it's a great stress reliever.

EDDY WATCH: 1993 CONTENDERS

As soon as we rip open the envelopes and announce this year's Eddy Award winners, it's time to begin researching next year's awards. Although it's much too early to project winners, here's a peek at some early contenders for the 1993 Eddy Awards:

- Acrobat** (Adobe).
- AEPort** (Applied Engineering).
- After Effects** (CoSA).
- Collaborative Mac** (Photonics).
- Component Workshop** (Component Software).
- Data Desk 4.0** (Data Description).
- DeltaGraph Professional 3.0** (DeltaPoint).

- Digital Film** (SuperMac).
- Dynamics** (Great Plains Software).
- Fetch** (Aldus).
- 4th Dimension 3.0** (ACI US).
- The Journeyman Project** (Presto Studios).
- LaserWriter Pro series** (Apple).
- MacWrite Pro** (Claris Corp.).
- MoviePak** (RasterOps).
- Newton** (Apple).
- Norton Essentials for PowerBook** (Symantec).
- Now Up-to-Date 2.0** (Now Software).
- OCE** (Apple).
- Ofoto 2.0** (Lightsource).

- PageMaker 5.0** (Aldus).
- Phaser 200i** (Tektronix).
- ProofPositive Printers** (SuperMac).
- QuarkXPress 3.2** (Quark).
- Ready, Set, Go! 6.0** (Manhattan Graphics).
- Retrospect 2.0** (Dantz).
- Spectre Supreme** (Velocity).
- Spreadbase** (Objective Software).
- Stacker for Mac** (Stac).
- Timbuktu 5.0** (Farallon).

Watch *MacUser* in the months ahead for reviews of these and other Eddy-caliber products. When it comes to the Eddy Awards, *MacUser* editors never rest.

continues ►



MacUser Editors' Choice Awards

1992 Product Directory

Accountant, Inc.

MultiUser 3.5
Softsync, Inc.
800 S.W. 37th Avenue
North Tower, Suite 355
Coral Gables, FL 33134
305-444-0080
\$1,195

Action! 1.0

Macromedia
600 Townsend Street
San Francisco, CA 94103
415-252-2000
\$495

Arcus

Agfa Division, Miles, Inc.
200 Ballardvale Street
Wilmington, MA 01887
508-658-5600
\$3,950

AsantéHub 1012

with in-band- and out-of-
band-management software
Asanté Technologies
821 Fox Lane
San Jose, CA 95131
408-435-8388
\$1,999

Audiomedia II

Digidesign
1360 Willow Road
Suite 101
Menlo Park, CA 94065
415-688-0600
\$1,295

Cachet 1.0.1

Electronics for Imaging, Inc.
2855 Campus Drive
San Mateo, CA 94403
415-286-8600
\$595

cc:Mail for Macintosh 2.0

Lotus Development Corp.
2141 Landings Drive
Mountain View, CA 94043
415-961-8800
\$495

Cinematic 1.0

Vividus Corp.
651 Kendall Avenue
Palo Alto, CA 94306
415-494-2111
\$495

Color-It! 2.0

Timeworks Publishing
625 Academy Drive
Northbrook, IL 60062
708-559-1300
\$299.95

ColorAccess 1.3

Barneyscan Corp.
P.O. Box 14467
Oakland, CA 94614
510-562-2480
\$695

ColorLink family of interface cards

E-Machines, Inc.
9305 S.W. Gemini Drive
Beaverton, OR 97005
503-646-6699
ColorLink DC/T, \$639
ColorLink EX/T, \$789
ColorLink SS/T, \$789
ColorLink SX/T, \$789

COPYright 1.0

CSG Technologies, Inc.
530 William Penn Place
Suite 329
Pittsburgh, PA 15219
412-471-7170
\$49

CPU 1.0

Connectix Corp.
2655 Campus Drive
San Mateo, CA 94403
415-571-5100
\$99

deBabelizer 1.2.15

Equilibrium Technologies
475 Gate Five Road
Suite 225
Sausalito, CA 94965
415-332-4343
\$299

DeltaGraph Professional for Macintosh 2.02

DeltaPoint, Inc.
2 Harris Court
Suite B-1
Monterey, CA 93940
408-648-4000
\$295

Diamonds 2.0

Varcon Systems, Inc.
10509 San Diego Mission
Road, Suite K
San Diego, CA 92108
619-563-6700
\$49.95

DrawingPad

CalComp Digitizer
Products Group
14555 N. 82nd Street
Scottsdale, AZ 85260
602-948-6540
\$395

DSP 3105

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754
508-486-5198
\$2,000

Du Pont PPI 1800

Du Pont Imaging Systems
P.O. Box 6099
Newark, DE 19714
302-774-1000
\$25,000

ElectricImage Animation System 1.5

Electric Image, Inc.
117 Colorado Blvd.
Suite 300
Pasadena, CA 91105
818-577-1627
\$7,495

EtherWay EL

International Transware, Inc.
1503 Grant Road
Suite 155
Mountain View, CA 94040
415-903-2300
\$999

Excel 4.0

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
206-882-8080
\$495

Expanded Book Toolkit 1.0

The Voyager Company
1351 Pacific Coast Highway
Santa Monica, CA 90401
310-451-1383
\$295

Expanded Books

The Voyager Company
1351 Pacific Coast Highway
Santa Monica, CA 90401
310-451-1383
\$19.95 per book

FastCache Quadra

DayStar Digital, Inc.
5556 Atlanta Highway
Flowery Branch, GA 30542
404-967-2077
700/900, \$299
700/900/950, \$449

FileMaker Pro 2.0

Clarix Corp.
5201 Patrick Henry Drive
Santa Clara, CA 95052
408-727-8227
\$399

FLEXSCAN T560i

Nanao USA Corp.
23535 Telo Avenue
Torrance, CA 90505
310-325-5202
\$2,000

FontMonger 1.5

Ares Software Corp.
561 Pilgrim Drive
Suite D
Foster City, CA 94404
415-578-9090
\$149.95

Fontographer 3.5

Altsys Corp.
269 W. Renner Road
Richardson, TX 75080
214-680-2060
\$495

Frontier 2.0

UserLand Software
400 Seaport Court
Redwood City, CA 94306
415-369-6600
\$249

Funny: The Movie in QuickTime

Warner New Media
3500 W. Olive Avenue
Burbank, CA 91505
818-955-9999
\$39.99

GreatWorks 2.0

Symantec Corp.
10201 Torre Avenue
Cupertino, CA 95014
408-253-9600
\$299

In Control 1.1

Attain Corp.
48 Grove Street
Somerville, MA 02144
617-776-1110
\$129.95

Infini-D 2.0

Specular International
233 N. Pleasant Street
Amherst, MA 01004
413-549-7600
\$995

Insanity 1.0

UV Wave
722 Cobblestone Drive
Shreveport, LA 71106
318-868-9944
\$39.95

Inspiration 4.0

Inspiration Software, Inc.
P.O. Box 1629
Portland, OR 97202
503-245-9011
\$295

Inspire II

Alphatronix, Inc.
2300 Englert Drive
Suite C
Research Triangle Park, NC
27709
919-544-0001
\$3,995

IntelliDraw 1.0

Aldus Corp.
Consumer Division
9770 Carroll Center Road
Suite J
San Diego, CA 92126
619-695-6956
\$299

Interactive Physics II 1.01

Knowledge Revolution
15 Brush Place
San Francisco, CA 94103
415-553-8153
\$399

Kodak XLT 7720

Eastman Kodak Co.
343 State Street
Rochester, NY 14650
716-724-4000
\$24,895

LanRover/L

Shiva Corp.
One Cambridge Center
Cambridge, MA 02142
617-252-6300
\$699

LaserJet 4M

Hewlett-Packard
16399 W. Bernardo Drive
San Diego, CA 92127
(619) 592-4606
\$2,199

LetterPerfect for Macintosh 2.1

WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
801-222-5800
\$149

Living Books series

Broderbund Software
500 Redwood Blvd.
Novato, CA 94948
415-382-4400
Just Grandma and Me,
\$49.95
Arthur's Teacher Trouble,
\$59.95

Luminator LCD Projector

nView Corp.
11835 Canon Blvd.
Newport News, VA 23606
804-873-1354
\$999

M.Y.O.B 3.0

Teleware, Inc.
300 Roundhill Drive
Rockaway, NJ 07866
201-586-2200
\$249

MacEKG II 2.05

Micromat Computer Systems
7075 Redwood Blvd.
Novato, CA 94945
415-898-6227
\$150

MacinStor SpeedArray family

Storage Dimensions, Inc.
1656 McCarthy Blvd.
Milpitas, CA 95035
408-954-0710
SpeedArray Wide SCSI II family ranges from \$13,999 to \$48,999

The Macintosh Bible, 4th Edition

Peachpit Press, Inc.
2414 Sixth Street
Berkeley, CA 94710
510-548-4393
\$32

Macintosh Common Lisp 2.0

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
408-996-1010
\$495

MacroMind Director 3.1

Macromedia, Inc.
600 Townsend Street
San Francisco, CA 94103
415-252-2000
\$1,195

MacroModel 1.0

Macromedia, Inc.
600 Townsend Street
San Francisco, CA 94103
415-252-2000
\$1,495

MacTools 2.0

Central Point Software
15220 N.W. Greenbrier
Parkway
Suite 200
Beaverton, OR 97006
503-690-8090
\$149

Marble & Granite 1.0

Artbeats, Inc.
P.O. Box 1287
Myrtle Creek, OR 97457
503-863-4429
\$349

Millie's Math House

Edmark
6727 185th Avenue, N.E.
P.O. Box 3218
Redmond, WA 98052
206-556-8400
\$49.95

MiniCAD+ 4

Graphsoft
8370 Court Avenue
Ellicott City, MD 21043
410-461-9488
\$795

mira•35

Santos Technology, Inc.
383 Van Ness Avenue
Suite 1604
Torrance, CA 90501
310-320-8888
\$2,695

Morph 1.0

Gryphon Software
7220 Trade Street
Suite 120
San Diego, CA 92121
619-536-8815
\$149

Multiple master typefaces

Adobe Systems
1585 Charleston Road
Mountain View, CA 94039
415-961-4400
Minion Multiple Master,
\$470
Myriad Multiple Master,
\$370

NetDistributor Pro 1.0.1

TriX, Inc.
400 W. Cummings Park
Suite 2350
Woburn, MA 01801
617-933-8810
\$695

Network Vital Signs 1.0

Dayna Communications
50 S. Main Street
Salt Lake City, UT 84144
801-531-0600
\$449

Now Up-To-Date 1.1

Now Software
319 S.W. Washington Street
11th Floor
Portland, OR 97204
503-274-2800
\$99

Now Utilities 4.0.1

Now Software
319 S.W. Washington Street
11th Floor
Portland, OR 97204
503-274-2800
\$149

PageMaker 4.2

Aldus Corp.
411 First Avenue S.
Seattle, WA 98104
206-622-5500
\$795

PaintJet XL300

Hewlett-Packard
16399 West Bernardo Drive
San Diego, CA 92127
619-592-4606
PaintJet XL 300 without PostScript, \$3,495
PaintJet XL 300 with PostScript, \$4,995

Peachtree Accounting for Macintosh 2.0

Peachtree Software, Inc.
1505 Pavilion Place
Norcross, GA 30093
404-564-5800
\$99

Personal Press 2.0

Aldus Corp.
Consumer Division
9770 Carroll Center Road
Suite J
San Diego, CA 92126
619-695-6956
\$199

Persuasion 2.1

Aldus Corp.
411 First Avenue S.
Seattle, WA 98104
206-622-5500
\$495

Phaser IIsd

Tektronix
P.O. Box 1000
Wilsonville, OR 97070
503-627-7111
\$9,995

PhonePro 1.0

Cypress Research Corp.
240 E. Caribbean Drive
Sunnyvale, CA 94089
408-752-2700
\$950

PhotoDisc series

21st Century Media
2013 4th Avenue
Seattle, WA 98121
206-441-9355
Volume 1 & 2, \$399
Volume 3 (Background),
\$295
Multimedia sampler, \$49

PicturePress 2.5

Storm Technology, Inc.
1101 San Antonio Road
Suite 101
Mountain View, CA 94043
415-691-1111
\$199

Polaroid CS-500

Digital Photo Scanner
Polaroid Corp.
575 Technology Square
Cambridge, MA 02139
617-577-2000
\$3,995



MacUser Editors' Choice Awards

1992 Product Directory, continued

PowerPad

Sophisticated Circuits
19017 120th Avenue, N.E.
Suite 106
Bothell, WA 98011
206-485-7979

Granite, \$129

Granite with QuicKeys,
\$189

Platinum, \$129

Platinum with QuicKeys,
\$189

PowerPoint 3.0

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
206-882-8080
\$495

PowerPort Gold

Global Village
Communication, Inc.
1204 O'Brien Drive
Menlo Park, CA 94025
415-329-0700
\$499

Premiere 2.0

Adobe Systems
1585 Charleston Road
Mountain View, CA 94039
415-961-4400
\$695

PressWise 1.0

Aldus Corp.
411 First Avenue S.
Seattle, WA 98104
206-622-5500
\$2,295

Prince of Persia 1.0

Brøderbund Software
500 Redwood Blvd.
Novato, CA 94948
415-382-4400
\$49.95

Public Utilities 1.0

Fifth Generation Systems
10049 N. Reiger Road
Baton Rouge, LA 70809
504-291-7221
\$149

QMS 860 Hammerhead Print System

QMS, Inc.
One Magnum Pass
Mobile, AL 36618
205-633-4300
\$4,595

QuarkXPress 3.1

Quark, Inc.
1800 Grant Street
Denver, CO 80203
303-894-8888
\$895

QuicKeys 2.1.3

CE Software, Inc.
1801 Industrial Circle
West Des Moines, IA 50265
515-224-1995
\$149

Richard Strauss:

Three Tone Poems

The Voyager Company
1351 Pacific Coast Highway
Santa Monica, CA 90401
310-451-1383
\$59.95

Sherlock Holmes, Consulting Detective, Volume 1

ICOM Simulations, Inc.
648 S. Wheeling Road
Wheeling, IL 60090
708-520-4440
\$69.95

Sketch! 1.5

Alias Research, Inc.
110 Richmond Street E.
Toronto, Ontario M5C 1P1
Canada
416-362-9181
\$995

Sketcher 1.0

Fractal Design Corp.
335 Spreckels Drive
Suite F
Aptos, CA 95003
408-688-8800
\$149

Smartcom II for the Macintosh 3.4

Hayes Microcomputer
Products, Inc.
P.O. Box 105203
Atlanta, GA 30348
404-441-1617
\$149

Smoothie 1.02

Peirce Software
719 Hibiscus Place
Suite 301
San Jose, CA 95117
408-244-6554
\$149

SoftPolish 1.1

Language Systems Corp.
441 Carlisle Drive
Herndon, VA 22070
703-478-0181
\$295

Songworks 1.1

Ars Nova
P.O. Box 637
Kirkland, WA 98083
206-889-0927
\$125

Star Trek:

The Screen Saver 1.0

Berkeley Systems
2095 Rose Street
Berkeley, CA 94709
510-540-5535
\$59.95

StatView 4.0

Abacus Concepts, Inc.
1984 Bonita Avenue
Berkeley, CA 94704
510-540-1949
\$595

Stuffit Deluxe 3.0

Aladdin Systems, Inc.
165 Westridge Drive
Watsonville, CA 95076
408-761-6200
\$120

Systat 5.2

Systat, Inc.
1800 Sherman Ave.
Evanston, IL 60201
708-864-5670
\$895

TextureSynth 1.12

Pantechonicon
P.O. Box 738
Santa Cruz, CA 95061
408-427-1687
\$149

ThunderStorm

SuperMac Technology
485 Potrero Avenue
Sunnyvale, CA 94086
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WriteMove II

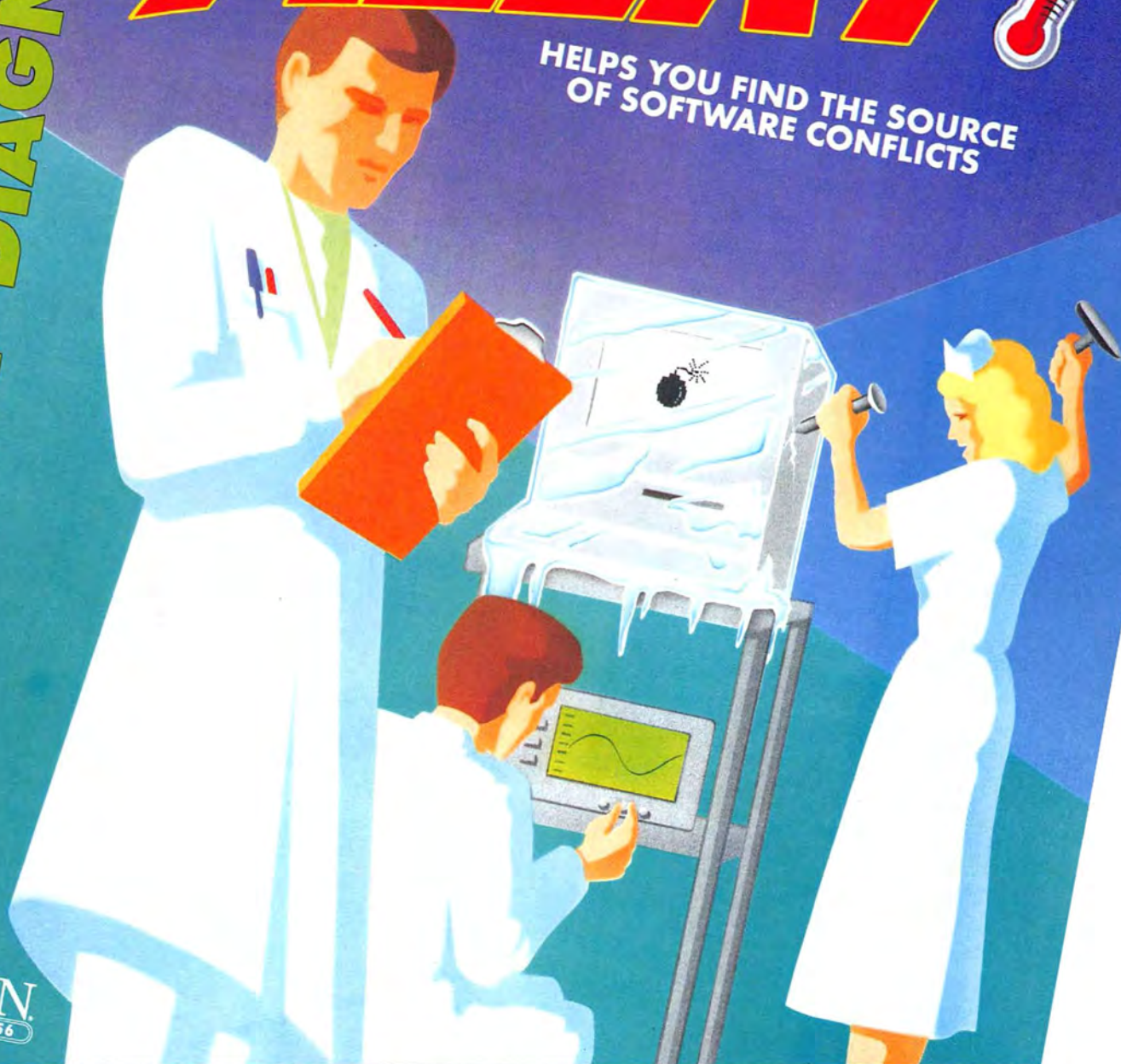
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BY RUSSELL ITO

Time is relative. Einstein told us that, but we could have figured it out ourselves. Any schoolkid who hasn't done the homework learns during those last, interminable minutes before the end of math class just how relative time can be. For the computer industry, time doesn't drag like those final minutes of class; it's more like that kid's perception of summer vacation: gone in a flash. At Apple these days, a year is an eternity for a product and two years — well, that's practically geological time. "More products in less time" is Apple's current credo, and now the company is applying that credo not only to CPUs but also to peripherals, specifically printers.

The StyleWriter II and the LaserWriter Pro series are at the opposite ends of Apple's printer spectrum. The former defines the lowest of the low end as far as laser quality (a resolution of 300 dpi or higher) is concerned, and the latter sets new standards for Apple in terms of

New Apple Printers

both resolution (600 dpi) and price. As you might expect, most of Apple's significant achievements are in the high-end LaserWriter Pro series, but the StyleWriter II boasts some notable enhancements of its own — and a list price that many users will find virtually irresistible.

StyleWriter II: Fast and Gray-Scale

The original StyleWriter was Apple's first truly low-end printer (remember, the ImageWriter II was the "high-end" printer back when the 512K was the "high-end" platform), but it's been nearly two years since its introduction. In the interim, Apple has issued several laser printers, but the lowly StyleWriter hasn't seen much action. Two driver updates provided background printing, raised the printing speed above the vegetative threshold, and added some fonts, but that's been it.

So the StyleWriter II, which replaces the venerable StyleWriter, is long overdue — at least by Apple's time standards. The StyleWriter II features redesigned hardware and software and a list price of \$359 — more than \$200 less than the first StyleWriter's asking price.

On the outside, the StyleWriter II is nearly as compact as the original — nearly, but not quite. Unlike the original — which came in two large pieces that snapped together (the print engine itself and the paper feed) and incorporated or required a foldout paper catcher and a wire paper-support bail — the StyleWriter II is a one-piece, solid-plastic affair. It's deeper than the original, but for a good reason: The StyleWriter II has an internal power supply and uses a standard AC cord — no more power bricks to lug around or trip over.

Internally, the StyleWriter II is both similar and dissimilar to its predecessor. On the similar side, it's still a 360-dpi inkjet (OK, bubblejet) printer and the inks are still water-based, so they will smear if you get them damp. On the dissimilar side, Apple has improved the paper handling (you can load as many as 100 sheets of paper — double the original printer's capacity — or 15

envelopes) and has changed the print head. The StyleWriter II's print head is closer to the paper, ensuring more accurate dot placement; fires twice as fast as the original, for improved print speed; and perhaps most important, prints bidirectionally, so the head can lay down ink in both directions across the page.

The biggest changes, however, are in the StyleWriter software. The new driver achieves several goals: increased speed; gray-scale printing; and printer sharing for small, networked environments.

With the new StyleWriter driver, Apple introduced GrayShare, a technology that not only lets formerly monochrome-only printers such as the StyleWriter print grays but also permits you to share printers that are otherwise not networkable (for details on how GrayShare works, see the "Going Gray" sidebar). Because the StyleWriter II, like the original StyleWriter, is a serial-only device, you can't connect it to a network without some kind of patch to the driver, and Apple has provided that

patch with GrayShare. Users on a network can share a StyleWriter II simply by going to the Chooser and selecting the printer. When you issue a print job, GrayShare sends the job to the host computer to which the StyleWriter II is connected. The host machine then handles all the tasks associated with rasterizing and printing the job.

A Quick Performance

In our tests of a prerelease unit, when printing text, the StyleWriter II was about twice as fast as the original

StyleWriter (the first StyleWriter that had a revised printer driver). Instead of performing at that driver's rate of approximately 1 ppm (page per minute), the StyleWriter II churned out text at a rate of about 2 ppm (see Figure 1) — a huge improvement from the *very* first version of the StyleWriter, which printed at a lethargic half page a minute. And even when it was printing a relatively complex Word document that included a gray-scale image, the StyleWriter II was slightly faster than

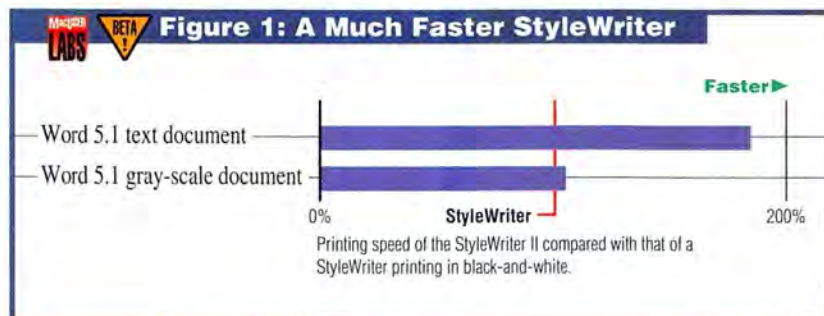


Figure 1: The StyleWriter II is a vast improvement over Apple's original low-end laser-quality printer. About twice as fast as the StyleWriter when printing text, the StyleWriter II is even slightly faster when printing gray-scale images than the StyleWriter is when printing black-and-white (the StyleWriter can't print gray scale). The text in our complex Word 5.1 document looked very good, and the gray-scale image was crisp.

Figure 2: The StyleWriter II's Better Kerning

“What was the Sherlock Holmes principle?” “Once you have whatever remains, however improbable, must be the truth.”

“What was the Sherlock Holmes principle?” “Once you have whatever remains, however improbable, must be the truth.”

Figure 2: Comparing the StyleWriter's output (top) to the StyleWriter II's (bottom), you can see how much better the StyleWriter II's kerning is. Note the better spacing in the word *principle*.

the StyleWriter printing the same document in black-and-white (the original StyleWriter can't print gray scale).

The overall type quality of our five-page Word 5.1 document, which also included TrueType fonts and a simple table, was as sharp as or sharper than that of the original StyleWriter's, and the StyleWriter II's kerning was noticeably better (see Figure 2). Even at small font sizes, the text didn't show any jaggies, and white text on a black background looked clean and sharp. The gray-scale image was crisp, but we did notice that large, dark areas tended to lose some detail.

Based on what we've said so far about GrayShare, you're probably thinking that its impact on the host computer would be disastrous. Well, surprise, surprise: That isn't true. Although the host machine does take a performance hit, it isn't anything major. If you're entering data during a GrayShare print job, your keystrokes won't appear on-screen as smoothly as they normally do but you won't be rendered helpless either. In our informal tests, the keystrokes briefly stopped appearing on-screen and then snapped on, much as they might if you received a mail message while in the midst of entering

Going Gray

The original StyleWriter was a black-and-white printer. It didn't do gray. If you printed a scanned photograph on the StyleWriter, the printer would turn everything light to white and everything dark to black. It was not a pretty sight (see lefthand print sample). The problem lay in the StyleWriter's printer driver, which used the old black-and-white version of QuickDraw to image graphics. The StyleWriter II's driver incorporates Apple's new GrayShare technology, which uses the newest Color



The original StyleWriter printed black-and-white blobs in lieu of gray shades.



With its new driver, the StyleWriter II is capable of printing more than 100 shades of gray.

under MultiFinder will do. Printer Share has been optimized to run efficiently in the background. Apple claims that someone doing other work on the server Mac while printing is taking place in the background will barely notice a difference in the Mac's responsiveness. Our preliminary tests using beta hardware and software confirmed Apple's claim: There is a performance hit, but it's something you can live with.

GrayShare technology will also be incorporated into the driver of the new Apple

QuickDraw to render color and gray-scale images. The benefit is readily apparent (see righthand print sample). The StyleWriter II driver can produce more than 100 shades of gray.

Another important aspect of GrayShare technology is Printer Share. Although the StyleWriter II isn't a networkable printer, you can share it by connecting it to a networked Mac and using that Mac as a print server (see figure at right). It works like this: Say there's a Mac on your network (the server) to which a StyleWriter II is connected and it's running the Printer Share extension. Your Mac (the client) is on the same network and is also running Printer Share. When you select the StyleWriter II driver in the Chooser, you see the name of the server. When you print, Printer Share on your Mac sends your job to Printer Share on the server Mac. PrintMonitor then prints the job from the server machine.

You need not be running PrintMonitor on the client Mac. In fact, you need not be running System 7; System 6.0.7 running

Color Printer (see New on the Menu in this issue), so it too will work with Printer Share. In fact, although Apple isn't trumpeting the fact, the StyleWriter II driver will work with the original StyleWriter as well. At press time, Apple hadn't decided how it would distribute the new driver to the installed base of StyleWriter owners. Read: You might have to pay for it.

— Henry Bortman



To share a StyleWriter II, you click on the Set Up button in the Chooser to get to this dialog box.

New Apple Printers

Figure 3: More Grays or Sharper Images?



Figure 3: Comparing the gray-scale-image quality of the LaserWriter IIfx with PhotoGrade (left), the Pro 630 at 300 dpi with the new PhotoGrade (center), and the Pro 630 at 600 dpi (right) reveals some interesting differences. The Pro 630 at 300 dpi with the new PhotoGrade shows more grays, but its output at 600 dpi is significantly sharper.

data. It wouldn't be fair to say that GrayShare has no impact on the host, but what impact it does have is probably unintrusive enough that most users won't object — especially considering the printer's price.

A Bargain Buy

In fact, with its suggested list price of just \$359, the StyleWriter II is a steal. Its printed output is sharp, and its gray-scale software gives you clear, crisp images. Users who want laser-quality printing but can't afford to make the move up to a laser printer should take a long, hard look at the StyleWriter II. And although GrayShare isn't an ideal networking product, it does afford some additional flexibility for small workgroups.

The LaserWriter Pros: Top of the Line

In 1991, the LaserWriter IIfx and IIfx were Apple's premier printers. But that was then, and this is now. Today they're like yesterday's newspaper: old news. At 600 dpi, the LaserWriter Pro series — models 600 and 630 — are the highest-resolution printers Apple has produced so far, and they're also the most affordable high-end printers from Apple, carrying list prices of less than \$3,000.

If you've kept an eye on the printer market recently, you've probably already guessed the driving force behind Apple's achievements in the Pro series. Last October, Hewlett-Packard introduced the LaserJet 4M, the first printer to use Canon's new EX engine. The PostScript Level 2 LaserJet 4M is compact; prints 8 ppm at 600 dpi; and was an easy winner in price/performance, being the first printer with its resolution to break the \$3,000-list-price/\$2,000-street-price barrier.

Of course, Apple isn't going to ignore a challenge

from so formidable a competitor, so it's gone HP a few steps better with the Pro series — its implementation of the same Canon engine. Like the 4M, the printers in the Pro line are compact — their footprints are significantly

smaller than those of the printers in the LaserWriter IINT line, which preceded them. And like the 4M, the Pro models are 8-ppm, PostScript Level 2 models, with a variety of paper-handling options. The printers include a foldout, multipurpose 100-sheet tray (it can be used for letter- or legal-sized paper and as many as 10 envelopes), a standard internal paper tray with a 250-sheet capacity, and an optional 500-sheet sheet feeder that fits on the bottom of the printer (an optional 75-envelope envelope feeder is also available). The optional, easy-to-install sheet feeder is a particularly elegant choice for large offices. All you have to do is put the printer on top of the sheet feeder, and the Pro automatically senses its presence and reconfigures itself — without requiring a restart.

Pending the release of the Level 2 driver, which should offer extensive paper-handling options, Apple has issued a Pro-series LaserWriter driver that offers multitray options such as tray sequencing (for example, you can set the printer to print page 1 from the standard tray and all subsequent pages from the sheet feeder or to automatically switch from the internal tray to the sheet feeder when the standard tray is empty).

More Grays, Sharper Pictures

The IIfx's and IIfx's two big wins were in Apple's unique resolution-enhancement technologies: FinePrint, for text and line art, and PhotoGrade, for gray-scale images. Knowing a good thing when it sees it, Apple has adapted both technologies to work with the new engine,



Figure 4: The LaserWriter Pro 630's back panel is so compact that Apple had to use a PowerBook-style SCSI port in order to make a SCSI port available. The printer comes with EtherTalk, LocalTalk, and parallel ports standard.

so you get both in the Pro series (PhotoGrade is an option on the 600, requiring the addition of 4 megabytes of RAM). But even though the EX is a true 600-dpi engine, FinePrint and PhotoGrade are active only when the printer is printing in 300-dpi mode. When you print at 600 dpi, the dots are already so fine that you don't get any boost from the resolution-enhancement software. Even so, the software is improved. PhotoGrade on a LaserWriter Pro, for example, can now produce 91 gray levels at a line screen of 106, compared with 67 on the LaserWriter IIg with the same line screen. At 600 dpi, the number of grays drops to 51 with a line screen of 85, but the image quality is much sharper (see Figure 3).

And for mixed-platform environments, Apple included parallel and serial ports on each Pro model plus Apple's All Ports Active port-switching capability. The Pros don't offer automatic emulation switching or job buffering, but they do support HP-PCL 4+ for those DOS applications that don't use PostScript to print.

Pro Processors

The LaserWriter Pro line consists of two very similar printers. Because they use the same engine, their printing speeds are the same, as are their paper-handling options. Their processors are also the same, but they aren't the processors you might expect. Although the rest of the printer industry seems to be converting to RISC processors for better speed, Apple stuck with a CISC chip for the Pro line, saying that combining a 25-megahertz 68030 chip with ASICs (application-specific integrated circuits) gives the printers the same performance that other manufacturers get from RISC chips such as the Intel 960i and the Advanced Micro Devices 29000 family. The differences between the two Pro-series printers are primarily matters of configuration, not performance.

The LaserWriter Pro 600

The LaserWriter Pro 600 is now Apple's workhorse printer, the model Apple thinks most users will go for. Its native printing mode is 300 dpi with FinePrint active,

but you can increase the resolution to 600 dpi and activate PhotoGrade by adding 4 megabytes of RAM to its standard 4 megabytes (each printer model can be expanded to a maximum of 32 megabytes of RAM). The 600 includes LocalTalk, parallel, and serial ports but no SCSI port and no EtherTalk option. The latter two ports can't be added after purchase, because they require motherboard modifications, but Apple will offer a motherboard-swap upgrade, so you'll be able to upgrade a 600 to a 630.

The LaserWriter Pro 630

The LaserWriter Pro 630 becomes Apple's top-of-the-line printer. Its native printing mode is 600 dpi, thanks to its standard 8 megabytes of RAM. With that additional memory, you get both PhotoGrade and FinePrint automatically when you print at 300 dpi. The 630 comes with LocalTalk, parallel, and serial ports standard, but it also offers an EtherTalk port and two SCSI ports (one internal and one external). The internal SCSI port supports 2.5-inch, half-height drives. The external SCSI port isn't the familiar 50-pin version; instead, the 630 is the first Apple peripheral to use the square, 29-pin SCSI port Apple introduced on the PowerBooks. As with the PowerBooks, the primary reason was space: The 630's back panel is so small that there isn't room for a SCSI port larger than the 29-pin version (see Figure 4).

A Crisp Performance

Because the 600 and 630 are basically the same and because we believe that buyers of the 600 should automatically buy a memory upgrade to take advantage of PhotoGrade, we decided to test only the 630 in its standard configuration — that is, 8 megabytes of RAM with no SCSI devices attached. Overall, the results with our prerelease unit were impressive (see Figure 5).

In our 20-page, text-only Word 5.1 test, the Pro 630 was marginally faster than the LaserWriter IIg, whether the 630 was printing at 300 or 600 dpi.

As you might expect, the print quality was very good, with few, if any, jaggies visible. Even compared with

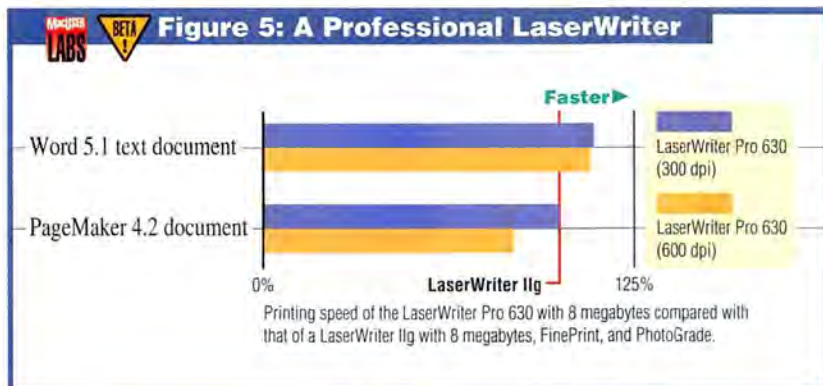


Figure 5: The LaserWriter Pro 630, the top of Apple's LaserWriter line, produces the sharpest output and the most grays. In terms of speed, the 630 was a virtual match for the LaserWriter IIg overall, but the 630's print quality at 600 dpi was significantly better than that of the 300-dpi IIg with FinePrint and PhotoGrade. Fine lines and small text showed few, if any, jaggies, and the image quality was much sharper.

New Apple Printers

FinePrint-enhanced text, the Pro 630's output shone; it was much crisper, and letters smaller than 6 points in size retained their shapes without filling up.

Our complex, five-page PageMaker file — which included seven TrueType fonts (several from the new Apple Font Pack [\$99]); a complex PostScript illustration; a 300-dpi, gray-scale TIFF image; a FreeHand technical illustration; and a PICT image — printed only slightly more slowly on the Pro 630 than on the IIf, even though the Pro 630 was printing at 600 dpi versus the IIf's 300 dpi. When printing at 300 dpi, the Pro 630 matched the IIf perfectly. The Pro 630's image quality at 600 dpi, however, was significantly better than that of the IIf with PhotoGrade. Thanks to the Pro 630's micro-fine toner, the blacks were much blacker and the fine lines — whether in text or in the technical illustration — were clear and sharp. Although the 630 renders fewer grays at 600 dpi than it does at 300 dpi with PhotoGrade, the gray ramps in our test documents were much more linear at 600 dpi.

The New Standard

With the introduction of the LaserWriter Pro 600 and 630, the LaserWriter IIf and IIfx will vanish from the market. Given their replacements' capabilities, though,

potential buyers are unlikely to miss them. The new models offer much better resolution and built-in cross-platform and networking support, and Apple is throwing in the Apple Font Pack as well, to give you a total of 64 TrueType fonts.

Above all, though, the Pros represent significant value. The LaserWriter Pro 600 carries a suggested list price of only \$2,099; the 630 goes for \$2,529. The 630's price is virtually the same as Hewlett-Packard's price for the LaserJet 4M, but that printer doesn't offer Ethernet standard (you have to add an Ethernet interface card, and the HP version of the card gives you Ethernet but takes away your LocalTalk port) and HP's resolution enhancement works only on text, not graphics.

High and Low

The StyleWriter II and the LaserWriter Pro line define the opposite ends of the Apple printing spectrum. Although they're aimed at tackling different printing problems, Apple's goal with the products is clearly the same: better imaging at a lower cost. Whether you're in the market for a low-end monochrome or a high-end printer, it may be Apple time. 🖨️

Russell Ito still can't believe how much he paid for his ImageWriter II.

Table 1: Apple's New Printers at a Glance

			
	LaserWriter Pro 600	LaserWriter Pro 630	StyleWriter II
List price	\$2,099	\$2,529	\$359
Dimensions (L x W x H)	16.9 x 16.8 x 12.1 in.	16.9 x 16.8 x 12.1 in.	13.6 x 7.9 x 7 in.
Weight	39 lb	39 lb	6.6 lb
Page-description language (PDL)	PostScript Level 2	PostScript Level 2	QuickDraw
Optional PDL	HP-PCL 4+	HP-PCL 4+	none
Resolution	300 dpi with FinePrint	600 dpi	360 dpi
Optional resolution	600 dpi and PhotoGrade with 4-MB RAM upgrade	300 dpi with FinePrint and PhotoGrade	none
Processor	25-MHz 68030	25-MHz 68030	none
Memory	4 MB standard, 32 MB maximum	8 MB standard, 32 MB maximum	none
Speed	8 ppm	8 ppm	2 ppm
Interfaces	LocalTalk, parallel, and RS-232 serial	LocalTalk, parallel, EtherTalk, and RS-232 serial	serial
SCSI	none	internal and external (29-pin)	none
Font support in ROM	TrueType and Type 1	TrueType and Type 1	none
Number of fonts included	64 TrueType	64 TrueType	39 TrueType
Paper supply	100-sheet multipurpose, 250-sheet standard tray	100-sheet multipurpose, 250-sheet standard tray	100-sheet input tray
Optional paper supply	500-sheet sheet feeder, 75-envelope envelope feeder	500-sheet sheet feeder, 75-envelope envelope feeder	none

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Address for Success

BY KEN GRUBERMAN

If you don't want a "sorry, wrong address book" message, you'd better check our rating of eight address-book programs that promise to replace your Rolodex.

"You know my name — look up the number." That used to be a simple task — back when most of us had no more than two numbers to look up. Now, in addition to home and office phones, we're likely to have fax numbers, E-mail addresses, and maybe a cellular phone or a pager. With so many numbers to keep track of, we've pretty obviously exceeded the limits of that jammed-to-bursting Rolodex card file.

To the rescue come eight packages specifically aimed at Rolodex relief: Address Book Plus 2.0.1, Contact! 1.0, Dynodex 3.0, Hello! August 1992, InTouch 2.0.2, MacPhonebook 3.0.6, Super QuickDex II 2.5.6, and TouchBASE 2.0.1. It's a crowded field, but the two winners were easy to pick.

All these programs basically do one thing — they help you keep track of addresses and phone numbers — although a few of them have additional features, such as reminders or memos.

Address-book programs are essentially dedicated database programs that are smaller, cheaper, and faster than their general-purpose counterparts, such as FileMaker Pro and Panorama. Like database programs, which are either flat-file or relational, address-book programs also come in two varieties: free-form and structured.

Fast and Free-Form

The free-form packages we looked at were InTouch, Contact!, Super QuickDex II, and MacPhonebook. Typically, a free-form program requires little disk space for the application itself and even less for its files. Free-form programs are quick to display information. The bad news is

Address-Book Programs

that most of them can't perform sorts of any kind, and importing and exporting data with them is problematic at best, infuriating at worst. And because free-form programs store data in a raw text block rather than in discrete fields, automatic formatting, such as for phone numbers, is impossible.

InTouch 2.0.2: Best of the Free-Form. The latest iteration of InTouch is much better than previous versions. You get a network-compatible application, a DA version for System 6 users, one system extension for reminders, a control panel called Snap for doing InTouch lookups and dialing from within other applications, and some bar-code fonts and special sounds. Thankfully, Advanced Software uses the Apple Installer, making the process of assembling InTouch on your hard disk easy.

The nicest thing about InTouch is its interface. Everything is contained in one compact window (see Figure 1) — the names list, individual record information, and an icon strip that makes good use of color. And even with all those elements, the window doesn't look crowded. Best of all, the window is resizable, and the program keeps all the icons in it appropriately spaced, no matter how large it is. The other nice thing about InTouch is the Groups function, which allows you to record as many user-defined groups as you want by clicking next to a group name. Although it would be nice to be able to do this while *entering* the information instead of afterward, it's still a good feature.

Unlike most free-form programs, InTouch can perform rudimentary sorts. You can sort a list of names by last name or other criteria, but sorts cannot be undone. The key to a successful sort is uniform data input, however, and because InTouch is a free-form program, the responsibility for consistent data entry falls on the user, not the program. InTouch's sorting and grouping speed is lightning-fast.

The weakest part of InTouch is no surprise: importing and exporting. The program supports only ASCII text files, QuickDex files, and InTouch files. Getting information into the program from files that contain a lot of tab-delimited text or from a structured database is very difficult. Also, picking which phone number you want InTouch to dial is not as easy as it should be, and using a button called Insert instead of Add or New to create a new record is potentially confusing. On the whole, however, if you're looking for a free-form address-book program that's fast, small, simple, and aesthetically pleasing — and you don't care too much about importing and exporting data — you can't go wrong with InTouch.

Contact! 1.0: Compact and Contradictory. Although Contact!, a newcomer from a relatively unknown company, is useful in certain respects, it's a step down from InTouch.

Contact!'s main limitation is its one and only window. As with InTouch, everything is available in the window,

Dial M for Macintosh

One simple task no Mac address-book program can do as well as you'd probably like is dial your phone. The two most common techniques — using a modem to dial or holding the phone handset next to the Mac's speaker while the computer plays touch-tones — work, sort of. But both have the kind of drawbacks you'd expect from such kludgy solutions.

Sophisticated Circuits aims to change that with the Desktop Dialer, a \$75 gadget that you can plug in to your Mac's ADB port and then connect to your phone line. Once you've installed the Desktop Dialer's software, you can pick up your phone and have the Mac dial it for you instantly. You don't even have to listen to the touch-tones, much less hold the handset up to the Mac's speaker. The Desktop Dialer can support two phone lines and even works with pulse telephones. The initial version doesn't work with most corporate phone systems, although Sophisticated Circuits promises to remedy that soon.

You can use the Desktop Dialer one of three ways. An included DA lets you set up a small phone list of frequently dialed numbers; by pressing a hot key, you can dial any number (from any application) that's been copied to the Clipboard, or you can dial direct from applications that support the Desktop Dialer. Which applications might those be? At press time, most of the publishers of the address-book programs in this article were on Sophisticated Circuits' developer list. Other developers include Claris (FileMaker), ACI US (4th Dimension), and Provue (Panorama).

Sophisticated Circuits, 19017 120th Avenue, N.E., Suite 106, Bothell, WA 98011; 206-485-7979.

— James Bradbury



but unfortunately it's a *very* small window that can't be resized. Tiny for 9-inch screens, it's positively minuscule on anything bigger. A few icons have blue components, but most of the window is in black-and-white.

Contact! has built-in dialing, but setting up the dialing functions involves manual entry of all the local three-digit prefixes in a caller's dialing area. None of the other programs requires this, and no explanation is given for it in the sometimes cryptic, sometimes folksy manual. The window has two sections: one for names and addresses and the other for phone numbers. Importing is as problematic as with InTouch, but Contact! has an additional aggravation: If you want phone numbers to appear where they belong after you've imported the data, you must manually click on each number to send it down to the

phone section. If you import a file with more than 500 records in it, you'll be clicking for quite a while!

To its credit, the software consists solely of a DA. It needs only 20K of RAM to operate, and the files it creates are ultrasmall. Contact! also offers one feature that is absent from the other programs: voice annotation. It supports the MacRecorder driver and built-in microphones; recording a voice note is as easy as two mouse clicks. Ironically, though, the attached sounds bloat the master data file, thus defeating the program's primary appeal.

Super QuickDex II 2.5.6: Old and Tired. QuickDex and InTouch have always been similar in the way they look and operate, but even the new QuickDex lags far behind InTouch — primarily because of its interface.

Casady & Greene has resisted the urge to put color into its product, so Super QuickDex II looks exactly like the original QuickDex did: tacky and cheap (see Figure 2). As with InTouch, everything is accomplished in one little window, but this window has no icons, no arrows, and no way to navigate to any record or even initiate a search. Worst of all, it can't be resized. The only thing you see is a text block with a scroll bar.

Casady & Greene encourages its customers to put anything they want into a deck (the company's name for a file). Besides addresses and phone numbers, you can enter to-do lists, shopping lists, favorite quotes — you name it. As a result, it's easy to clutter your decks with information that doesn't age well. That goes with the territory if you want to use a free-form database. Unfortunately, Super QuickDex II has many other shortcomings that outweigh the advantages of the unstructured approach.

Cataloging all of QuickDex's annoying aspects would

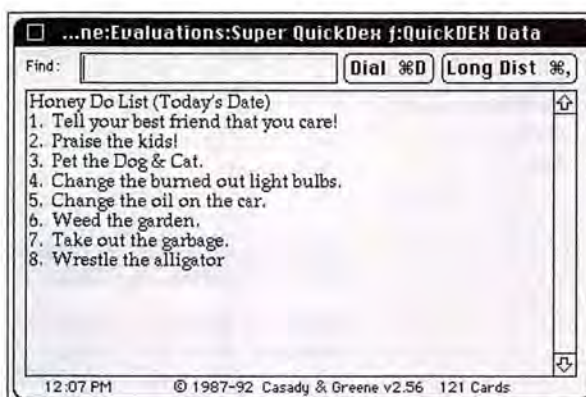


Figure 2: Super QuickDex II remains resolutely stuck in glorious black-and-white. The only way to move from one record to the next is to press the Return key, because QuickDex doesn't offer any navigational arrows. Because you can enter anything into a QuickDex card, QuickDex's decks can easily become littered with irrelevant information.

be exhausting, but here are just a few of the worst offenses: Setting the dialing preferences is the most difficult chore in QuickDex, because doing so requires working your way through a nearly incomprehensible dialog box.

What's especially irritating is QuickDex's reliance on separate applications and utilities for functions that are built in to the competitors' programs. Printing, for example, takes two separate utilities: One's an application for performing searches, sorts, and label printing, and one's a DA for printing single envelopes and labels. The package also includes two macro extensions for launching QuickDex or the envelope-printing utility with hot keys. Installing all these components is bothersome, because Casady & Greene's installer doesn't actually install everything it should, forcing you to drag-copy the various parts the installer has ignored, including template files and the macros. To add insult to injury, the manual's text is in one of Casady & Greene's semi-illegible fonts.

Super QuickDex II does boast a few virtues: Its searches are fast; you can have as many as eight decks open at a time; and it ships with a ZIP-code deck that, although incomplete, provides enough ZIP-code information for the average user. Unfortunately, that's just not enough to recommend buying this package.

MacPhonebook 3.0.6: Wrong Number. This last entry in the free-form category is so poorly written and so badly designed that you shouldn't even consider it.

If you don't remember how software looked and performed when the Mac Plus was Apple's hot item, you might be interested in MacPhonebook — but only as a historical curiosity. The notes field is limited to 40 characters, everything is in either the Chicago or the Monaco font, and dialing through the Mac speaker is not



Figure 1: InTouch, the best of the free-form address-book packages, gets everything you need into one resizable window. When you resize the window, the icons respace themselves appropriately. A record can contain as many as 48 categories, and the information can be displayed accordingly.

Address-Book Programs

Table 1: Features of Address-Book Programs Compared

	Key								
	Above average	Average	Poor	Not applicable	Address Book Plus 2.0.1	Contact! 1.0	Dynodex 3.0	Hello! August 1992	InTouch 2.0.2
Installation									
Easy installation	■	■	■	■	■	■	■	■	■
Ease of initial setup	■	■	■	■	■	■	■	■	■
Interface									
General ease of use	■	■	■	■	■	■	■	■	■
Data presentation	■	■	■	■	■	■	■	■	■
Flexibility of operation	■	■	■	■	■	■	■	■	■
Data entry	■	■	■	■	■	■	■	■	■
Dialing									
Ease of dialing setup	■	■	■	■	■	■	■	■	■
Dialing options	■	■	■	■	■	■	■	■	■
Sorting/grouping									
Ease of sorting	■	■	■	■	■	■	■	■	■
Sort speed	■	■	■	■	■	■	■	■	■
Search speed	■	■	■	■	■	■	■	■	■
Printing									
Variety of print formats	■	■	■	■	■	■	■	■	■
Modifying layouts	■	■	■	■	■	■	■	■	■
Ease of layout setup	■	■	■	■	■	■	■	■	■
Data import/export									
Ease of tab-delimited-text import	■	■	■	■	■	■	■	■	■
Import speed	■	■	■	■	■	■	■	■	■
Variety of export options	■	■	■	■	■	■	■	■	■
Integration									
Integration with external word processor	■	■	■	■	■	■	■	■	■
Mail-merge support	■	■	■	■	■	■	■	■	■

possible — and that's just for starters.

This version of MacPhonebook has been around for a few years, and right before this article went to press, we saw a beta copy of MacPhonebook 4. Although the program now looks merely clumsy instead of truly awful, the design and operating philosophy haven't changed.

Structured and Superior

The structured address-book programs in our group — TouchBASE, Dynodex, Address Book Plus, and Hello! — are generally preferable to the free-form models. In a structured package, each item in a record — such as first name, last name, and phone numbers — is entered in its own dedicated field. As a result, searching, sorting, and formatting information as well as importing and exporting data are usually easier than in free-form packages. Structured packages generally offer some sort of auto-formatting for text and phone numbers, and the printing options are more extensive. With many fields to choose from, it's easier to create reports, address books, and labels with just the information you desire. The

price for all these options is measured in kilobytes: Structured packages are generally larger in disk size, file size, and RAM requirements. The files they create also tend to be larger.

TouchBASE 2.0.1: Supreme Structure. The best word to describe TouchBASE is *balanced*. It strikes the perfect balance between simplicity and complexity, clarity and clutter. Easy enough for novices to learn in less than an hour, it has enough power for advanced users.

Address and phone-number information is displayed cleanly in one of two views, List view or Detail view, from the same resizable window (see Figure 3). There are four columns in the List view, and each can display any field. A nice touch is the inclusion of entire-name and entire-address fields.

TouchBASE can print various kinds of address books, envelopes (with bar codes and facing identification marks), detailed reports, mailing labels, and fax cover sheets without much fuss or bother. All the predefined layouts can be modified and saved, and printing is virtually foolproof. TouchBASE was the only address-book

program of the lot to print envelopes correctly on a Dataproducts LZR 960 laser printer.

TouchBASE's other significant features include auto-formatting of text and phone numbers, network and multiuser support, simple or complex searching with Boolean operators, and support for the Sharp Wizard.

But TouchBASE isn't perfect. Copying records from one TouchBASE file to another is overly complicated; there's no facility for creating multiple categories; and user-defined fields are limited to five all-purpose fields, two check boxes, and one date field. TouchBASE's sorting speed is slower than that of some of the free-form address books, and typical TouchBASE files of 400 to 500 records are in the 200K-to-300K range. Also, sorts are not permanent unless a separate application called TouchBASE Tools is used. We expect these problems to be solved in the newest version of TouchBASE, which should be out by the time you read this, but even with its problems, version 2.0.1 of the program is worth every cent of its purchase price.

Dynodex 3.0: A Close Second. The newly redesigned Dynodex is similar in abilities to TouchBASE, but it's not as easy to use and doesn't convey information with the same clarity.

The main data-entry window is a gray, black, and white affair with 3-D buttons to indicate the presence of pull-down menus and a somewhat redundant color icon strip down the left side (see Figure 4). The 3-D buttons and the small lettering on them tend to clutter up the screen. The icon strip is also confusing — it's not easy to figure out what some of the icons do just by looking at them. You can obtain a list of record names by opening the separate Just Names window, but font, size, style, and category selections are not available in either this

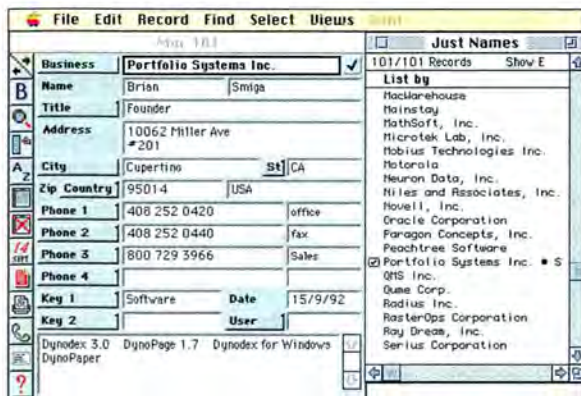


Figure 4: Dynodex is similar to TouchBASE but not as elegant. It presents two windows when you open it — the data-entry window and a Just Names window for fast record finding. Fields with a 3-D button indicate choices on a pull-down menu. Compared with TouchBASE, Dynodex looks and feels cluttered.

window or any of the predefined printing layouts. The program's RAM requirement — 800K for as many as 500 records, more for bigger files — is the biggest of all eight address-book programs we tested. Dynodex is network-compatible but only with the purchase of a separate network extension.

Dynodex does have some admirable traits, most notably "shorthand keys," user-defined words that can be stored in any of the field-name boxes; the program can also compile them for you. Once shorthand keys are set up, all you have to do is type in a few letters and the program types the rest for you. Dynamic Date Stamping; a complete, on-line help system; and the ability to synchronize two Dynodex files (one on your desktop Mac, for example, and the other on your PowerBook) are among Dynodex's other pluses. Best of all, every field name can be modified, so you can use Dynodex for things besides phone numbers.

Dynodex still isn't quite as satisfying to use as TouchBASE, but the gap has narrowed considerably.

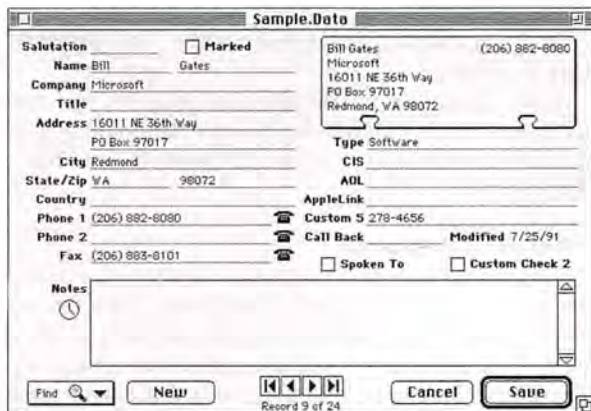


Figure 3: TouchBASE is the best address-book program you can buy. The Detail view displays all of your information in an easy-to-understand format. Although color would be nice, it's not as sorely missed here as in the other programs that lack it. TouchBASE's auto-formatting makes consistent data entry easy.

Address Book Plus 2.0.1: Marvelous Mediocrity. Address Book Plus is the Gerald Ford of address-book programs — workmanlike, dull, and somewhat clumsy. In other words, for aesthetics and practical usability, it's gloriously average (see Figure 5).

The first thing Address Book Plus could use is an installer. You must install Address Book Plus components in three places on your hard disk, and you have to figure out which items on the two floppy disks you really need. The next thing PowerUp should consider is the addition of a Preferences file. The only way users can store often-used file setups is to create a dummy document and then put it into the Preferences folder.

Address Book Plus shares some features with the other address-book programs, but its implementation of

Address-Book Programs

those features is usually not as good. For instance, Address Book Plus has its own version of shorthand keys called Smart Lists, but it has no auto-compile feature. Text-only auto-formatting is available, but phone-number formatting is not. Layout libraries for a wide variety of label and address-book products are provided, but they won't work unless you manually install them into the program. Worst of all, you are confronted with an overabundance of choices at initial file setup — definitions, layouts, names, options, and such — which makes getting started both intimidating and onerous.

Address Book Plus* positives include Sharp Wizard and Casio Boss support and a broad selection of international dialing codes, which makes setting up international phone numbers easy. It can import and export to HyperCard stacks, but there's an anomaly: The stack supplied for handling these I/O chores is a HyperCard 1.2.5 stack — it hasn't been updated for HyperCard 2!

Hello! August 1992: Say Goodbye. If Address Book Plus offers its users an excessive number of choices, Hello! takes just the opposite tack: There are no choices. The problem is, there are a lot of things about Hello! that most users would like to change but can't.

This lock-out concept, along with the program's unique version-numbering system (no version number, just a month and year) and the slick interface modeled after consumer electronics (see Figure 6) are all part of Hello!'s operating philosophy, which seems to be that because most users think software is too complicated, Atelier is going to make everything moronically easy.

Such a philosophy can be either practical or condescending, depending on how it's done. In the case of Hello!, it's condescending. You get the feeling that the programmers believe most Mac users are so stupid that they can't handle anything beyond the basics of pointing, clicking, and dragging.

Importing/exporting is a good example of how this concept is realized. Instead of a powerful, easy-to-use

Starter File: Date

▼ Prefix Last Suffix

▼ Job Title

▼ Company

▼ Dept

▼ Address

▼ City

▼ State Code

▼ Country

▼ Profession

User Definable

Birthday

▼ Category

List...

Business B
Contact C
Friend F
Personal P
Relative R

☒ Company ☒ Profession

Remarks

Revised: 5/7/91
Entry ID: 60

Delete

Figure 5: Address Book Plus manages to be both functional and clumsy. You enter data in the New Entries window — but note the huge number of pull-down lists. If you know how to type, the pull-downs just slow you down.



Figure 6: Hello! tries to be the address-book program for technophobes but instead ends up being condescending. The field names in Hello!'s data-entry view appear almost inactive, but they aren't. Color — and anything else for that matter — cannot be changed.

import/export system (like the one in TouchBASE), you have your choice of either MacWrite or plain-ASCII import, or a two-day service to do it *for* you. If the process were properly explained and implemented in the first place, the service wouldn't be necessary, but we're just mindless end users — what do we know?

Hello! is modular, so theoretically you have to buy only the modules you need, but the package ships with two modules: Address Book and Typewriter. The second module is for dashing off letters and memos; they're attached to the individual record names and can be called up with the names. Even the module's name is infuriating, because almost everyone knows by now (especially Ms. Robin Williams) that the Mac is *not* a typewriter. Yet any vestige of word-processing functionality — tab setting, margin setting, spacing, first-line indent, justification, style sheets, and predefined formats — has been removed, leaving you with . . . a typewriter. This is progress?

Hello! is modest in file size and program size and doesn't need a lot of RAM, but we can't recommend it to anyone other than the severely technophobic and Mac-impaired.

Rolodex Replaced

If you're looking for an address-book program that's flexible, easy to use, easy to learn, and powerful, try After Hours' outstanding TouchBASE. If you have memory or disk-space limitations, don't care about importing and exporting, and want something with some real zip to it, try Advanced Software's InTouch. So toss out that Rolodex. You know the names — look up the numbers — all of 'em.

Ken Gruberman works in Hollywood and uses a Mac address-book program to keep track of his agent's favorite pay phones.

Table 2: Address-Book Programs Rated

	Address Book Plus 2.0.1 ★★★★½	Contact! 1.0 ★★★	Dynodex 3.0 ★★★★	Hello! August 1992 ★★½
List price	\$99.95	\$98	\$89.95	\$95
Pros	Clairvoyance speeds data entry. As many as 45 category codes per record. Many types of address-book paper provided.	Auto-save protects data. Takes only 20K of system memory. Only utility of its kind to offer voice annotation.	Global and file-specific shorthand keys. Sync feature synchronizes two files. Layouts cover labels from virtually every supplier. Built-in mail merge.	Manual is clearly written. No saving required. Letters and memos can be attached to individuals' names. Streamlined interface.
Cons	Complicated setup. Auto-formatting works only with text, not phone numbers. No Preferences file. No auto-save option.	Can't perform sorts of any kind. Window cannot be resized and looks small on 13-inch or larger screens. No auto-formatting. Importing of even ASCII text is difficult.	Interface cluttered and sometimes confusing. High RAM requirement. No font, size, or style control in any of the layouts.	Interface elements hard to see in black-and-white or color. Auto-formatting works only on capitalizing text fields. Searching and sorting very basic. Slow sorting. Only import/export options are MacWrite 1 and 2 and plain text.
Company	PowerUp Software Corp. 2929 Campus Dr. San Mateo, CA 94403 415-345-5900 415-573-8693 (fax)	Psybron Systems, Inc. P. O. Box 431 Charleston, WV 25322 304-340-4260 304-340-4275 (fax)	Portfolio Systems, Inc. 10062 Miller Ave., Ste. 201 Cupertino, CA 95014 408-252-0420 408-252-0440 (fax)	Atelier Systems, Inc. 21607 Stevens Creek Blvd. Cupertino, CA 95014 408-366-6900

Table 2, continued

	InTouch 2.0.2 ★★★★	MacPhonebook 3.0.6 ★★½	Super QuickDex II 2.5.6 ★★★	TouchBASE 2.0.1 ★★★★½
List price	\$99.95	\$19.95	\$89.95	\$125
Pros	All functions contained in one resizable window. Fast search speed. Snap lets you look up address information without opening InTouch. Multiple categories. Built-in reminders.	Supports many printing formats.	Dialer can support extended dialing strings. QuickZip is a handy ZIP-code directory.	Easy to use and powerful. Single-window interface. Supports a range of printing options. Auto-formatting of all fields, whether text or phone.
Cons	Network use requires separate server application. No auto-formatting of text or phone numbers. Can open only one data file at a time. Sorts cannot be undone. Importing data from a structured database is very difficult.	Interface is extremely crude and inelegant. Comments limited to 40 characters. No formatting of any kind in text-entry fields. Can't modify preexisting layouts.	Interface still rudimentary, still only in black-and-white. Complicated dialing-preferences setup. Doesn't support ATM. Printing requires a separate application and DA.	Sorts are not permanent. Few user-defined fields. Copying a group of records between TouchBASE files is needlessly complicated.
Company	Advanced Software, Inc. 1095 E. Duane, Ste. 103 Sunnyvale, CA 94086 408-733-0745 408-733-2335 (fax)	Synex 692 Tenth St. Brooklyn, NY 11215 718-499-6293 718-768-3997 (fax)	Casady & Greene 22734 Portola Dr. Salinas, CA 93908 408-484-9228 408-484-9218 (fax)	After Hours Software 5990 Sepulveda Blvd. Van Nuys, CA 91411 818-780-2220 818-780-2666 (fax)

Passport to the Future:

CD-ROM DRIVES

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images. We test 23
CD-ROM drives
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to this brave
new world.*

BY JOHN RIZZO

Sometimes you *can* teach an old dog new tricks. The dog in this case is CD-ROM, the optical storage technology praised for its impressive capacity yet hounded by slow speed. Since it was introduced in the early '80s, CD-ROM has remained basically the same animal. Sure, drives have gotten cheaper (many are priced at less than \$500), but until recently, they still spun the same plastic discs at the same speeds and performed the same tasks. However, a CD-ROM revolution has begun, with new capabilities and faster operating speeds.



CD-ROM (short for compact disc, read-only memory) drives have always been more than one-trick ponies, with the ability to run data-filled CD-ROMs as well as their look-alike cousins, audio CDs. Now you can add a third type of disc to the compatibility list: Kodak's new *Photo CD*, which uses a graphics format useful to consumers and professionals alike. Meanwhile, several manufacturers are breaking old performance barriers by using a technology called *dual-speed* to spin discs faster. Naturally, we were curious to see whether any of this new-fangled stuff actually works. We were pleasantly surprised to find that it really does — some of it, at least.

Buying a CD-ROM drive is also different from the way it was in the old days. Now you often get half a dozen or more CD-ROMs bundled with a CD-ROM drive. With the Mac IIvx and Performa 600 — the first Macs to offer built-in CD-ROM drives — even Apple has joined the bundling bandwagon (see our reviews of the Mac IIvx, December '92, page 126, and the Performa 600, November '92, page 53).

Software developers are also creating more CD-ROMs. Patty Chang, senior analyst at DataQuest, estimates that the number of CD-ROM titles has nearly quadrupled since 1990.

Along with this flood of new titles comes a flood of new CD-ROM drives from which to choose. We tested 23 drives by clocking their speed in reading several popular commercial discs and some discs we'd created ourselves. The AppleCD 150 is from the oldest vendor of Mac CD-ROM drives, Apple, which enters its fifth year in the CD-ROM business. We also looked at the built-in AppleCD 300i in the new Mac IIvx. Both Apple drives are based on mechanisms by Sony, the coinventor of the compact disc (along with Philips), but the mechanism in the AppleCD 300i has some new tricks. Other Sony-mechanism-based drives

Serving Up the Platter

Although CD-ROMs containing databases or collections of clip art can be useful to many users in an office, CD-ROMs and CD-ROM drives aren't as plentiful or inexpensive as floppy disks and floppy-disk drives. Fortunately, you can share CD-ROMs over an AppleTalk network. Two methods are available: using System's 7's file-sharing feature and using AppleShare file-sharing server software. Unfortunately, it's not as easy as it sounds, because the Mac operating system does not treat CD-ROMs in the same way as it treats hard disks. And worst of all, when multiple users access the same CD-ROM, performance slows to a crawl.

System 7's file sharing lets you share a folder on a CD-ROM via the Sharing command on the Finder's File menu, just as you would with a hard disk. Unlike with a hard disk, however, you can't share the whole disc, only individual folders. What's more, just when you turn file sharing on in the Sharing Setup control panel can limit you further. If you turn it on *before* you insert a CD-ROM into the drive, you won't be able to share anything on the CD-ROM. If you boot your Mac with a disc in the drive and with file sharing turned on, the Finder prevents you from ejecting the disc, telling you that you can't eject a shared volume — even if nothing on the CD-ROM has been shared. You have to turn file sharing off before ejecting a CD-ROM. Other removable media, such as SyQuest or magneto-optical cartridges, work in the same way.

You'll run into fewer of these problems if you use a CD-ROM drive connected directly to a server Mac that's running AppleShare. Network administrators complained so much about having to shut down a file server in order to eject a disc that Apple removed this restriction with AppleShare 3.0 and later. Network administrators can change CD-ROMs on

an AppleShare file server at will, and users accessing a CD-ROM will see better performance and reliability than when they access a disc through System 7's file sharing.

If your network administrator has better things to do than to be a human disc changer, you can buy a drive that can handle several CD-ROMs. One such type of product is similar to the audio-CD jukebox in your neighborhood pizza parlor: Multiple discs are swapped in and out of a single drive mechanism. We tested the OAI 6/Pak and the Relax/Pioneer DRM-600, six-disc units based on a Pioneer mechanism.

Another approach is to use a drive that houses multiple mechanisms in one box. We looked at the OAI Quartet and the Todd Enterprises TCDR-4050, each of which contains four CD-ROM mechanisms. These drives proved to be about 100 percent faster on average than the jukebox drives. With a jukebox drive, you have to wait for discs to be swapped in and out of the drive, which can take several seconds per swap. Additional waiting is required when the drive is first started, because it cycles through all the discs to read the lists of files and folders each contains, which can take several minutes.

With either method, speed suffers considerably when multiple users access the same CD-ROM at the same time. With a single user accessing a disc, we found that access over a network was only 10 to 15 percent slower than access from the desktop. With three users accessing a CD-ROM at the same time, the time to access a file ballooned from roughly 2.5 minutes to an astounding 27 to 55 minutes. The moral of this story is that if multiple users are frequently accessing a CD-ROM on a file server, it's a good idea to buy a second CD-ROM and drive.

we tested include the Dynatek Compact Disc Subsystem; the PLI (Peripheral Land, Inc.) PL CD-ROM; the Procom Technology macCD Station, which comes bundled with seven CD-ROMs; and Procom's lower-priced macCD/LX.

Drives based on a Hitachi mechanism were represented by the Hitachi CDR-1750S and the Todd Enterprises TCDR-4050 and TCDR-7050. The Chinon CDA-435 and the Texel 5021 drives are based on their

manufacturer's own mechanisms. We also looked at two units — the OAI (Optical Access International) 6/Pak and the Relax/Pioneer DRM-600 — that are based on a jukebox mechanism from Pioneer that lets you mount six CD-ROMs at a time, using a single mechanism. Each is significantly slower than a single-disc drive, although OAI's superior driver software boosts the 6/Pak's overall speed to more than twice that of the Relax/Pioneer DRM-600. In

A Little Light, Reading

Flexible Circuit Board

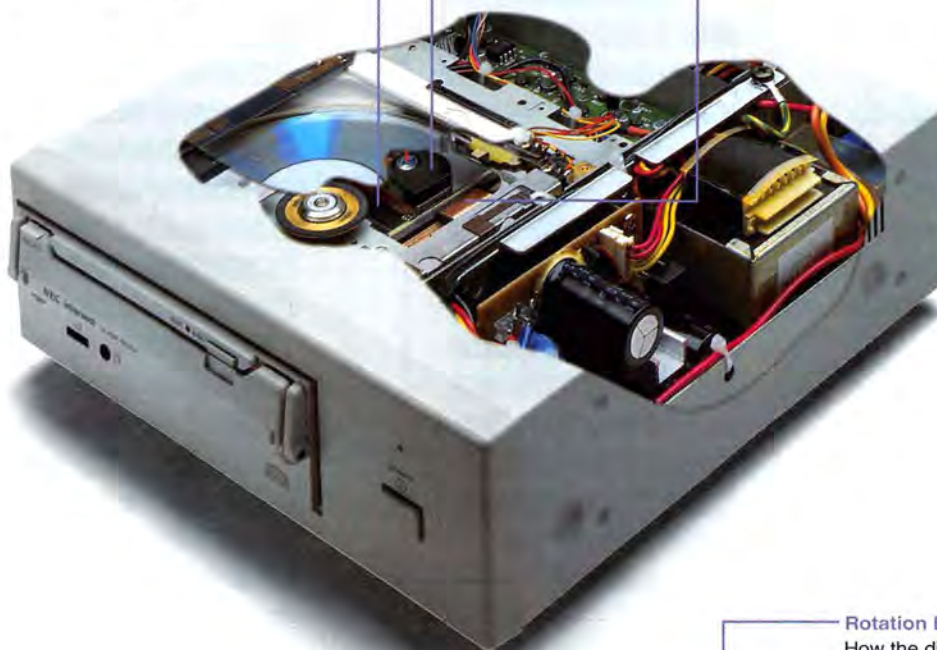
A *flexible circuit board* transfers signals read by the read head to the drive's motherboard, which converts them into information the Mac can understand, checks them for errors, and sends them to the SCSI port.

Read Head

The *read head* contains a laser diode and a lens. The head reads data by bouncing light off the disc as it spins over the head.

Sled

The *sled*, which is controlled by a servo mechanism, moves the head back and forth across the disc. Some manufacturers improve access time by decreasing the mass of the sled and the head and by reducing the time the servo mechanism takes to start and stop.



Single Data Track

Unlike a hard disk, which is divided into many small data tracks, a CD-ROM contains a *single data track* that spirals from the center to the outer edge. The sled moves the read head gradually toward the edge of the disc while the head reads data along the single data track.

In contrast to a vinyl LP, which moves at a constant rotational speed (33 revolutions per minute), a CD-ROM spins at a constant *linear* velocity. This means that the data track moves over the head at a constant speed, but the rotational speed slows as the head approaches the edge of the disc, where there is more track to cover in a single revolution.

With a *dual-speed*, or *Multispin*, drive, the rotational speed is doubled when the drive is reading data. This means that the disc spins at two linear velocities, one when it is playing audio and the other when it is reading data.

Rotation Direction

How the disc spins as viewed by the read head underneath the disc.

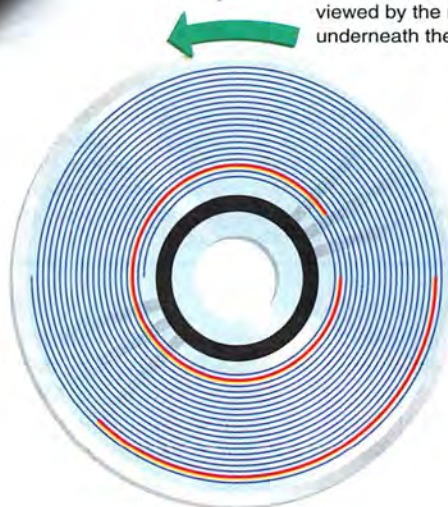
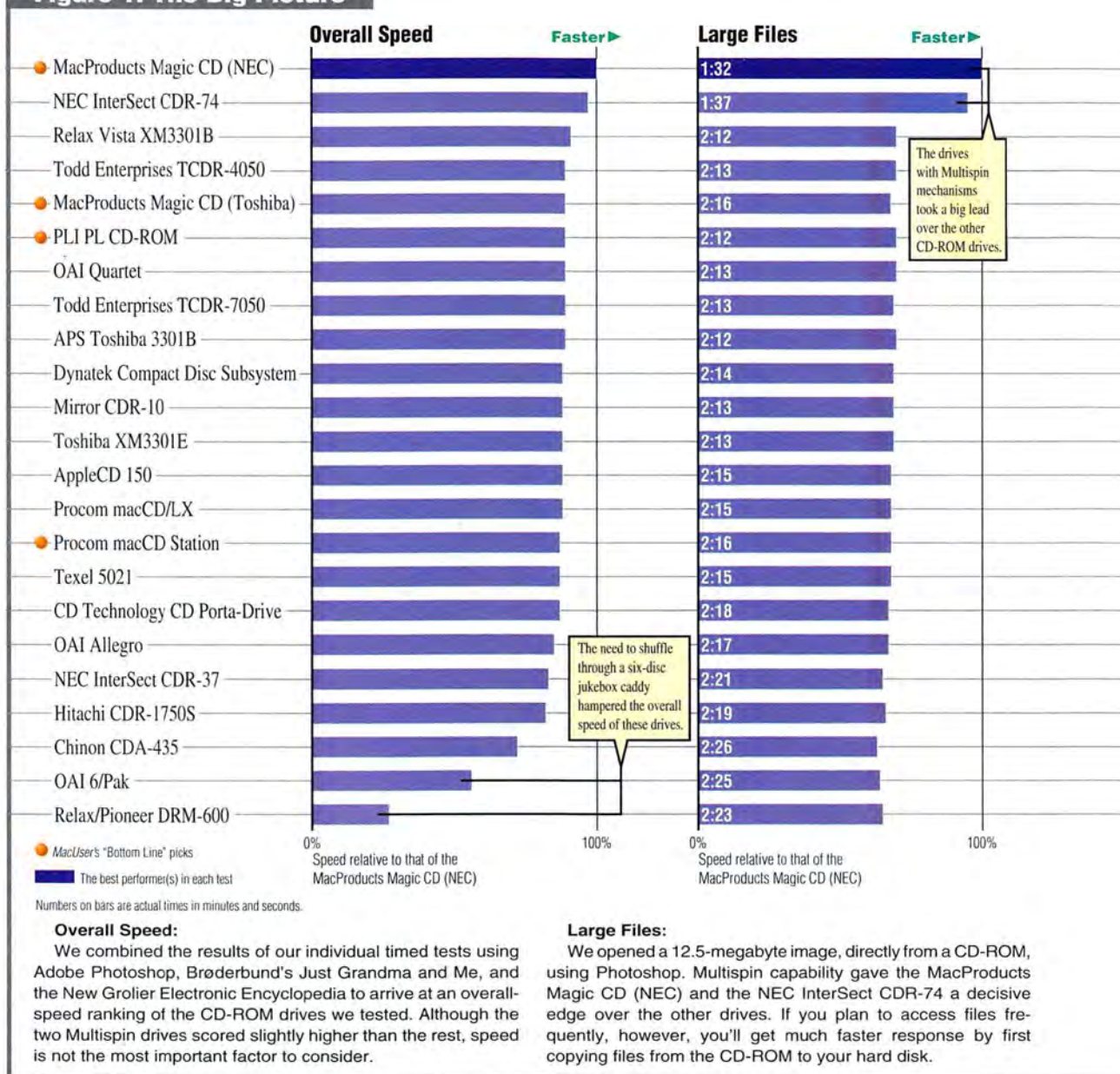


Figure 1: The Big Picture


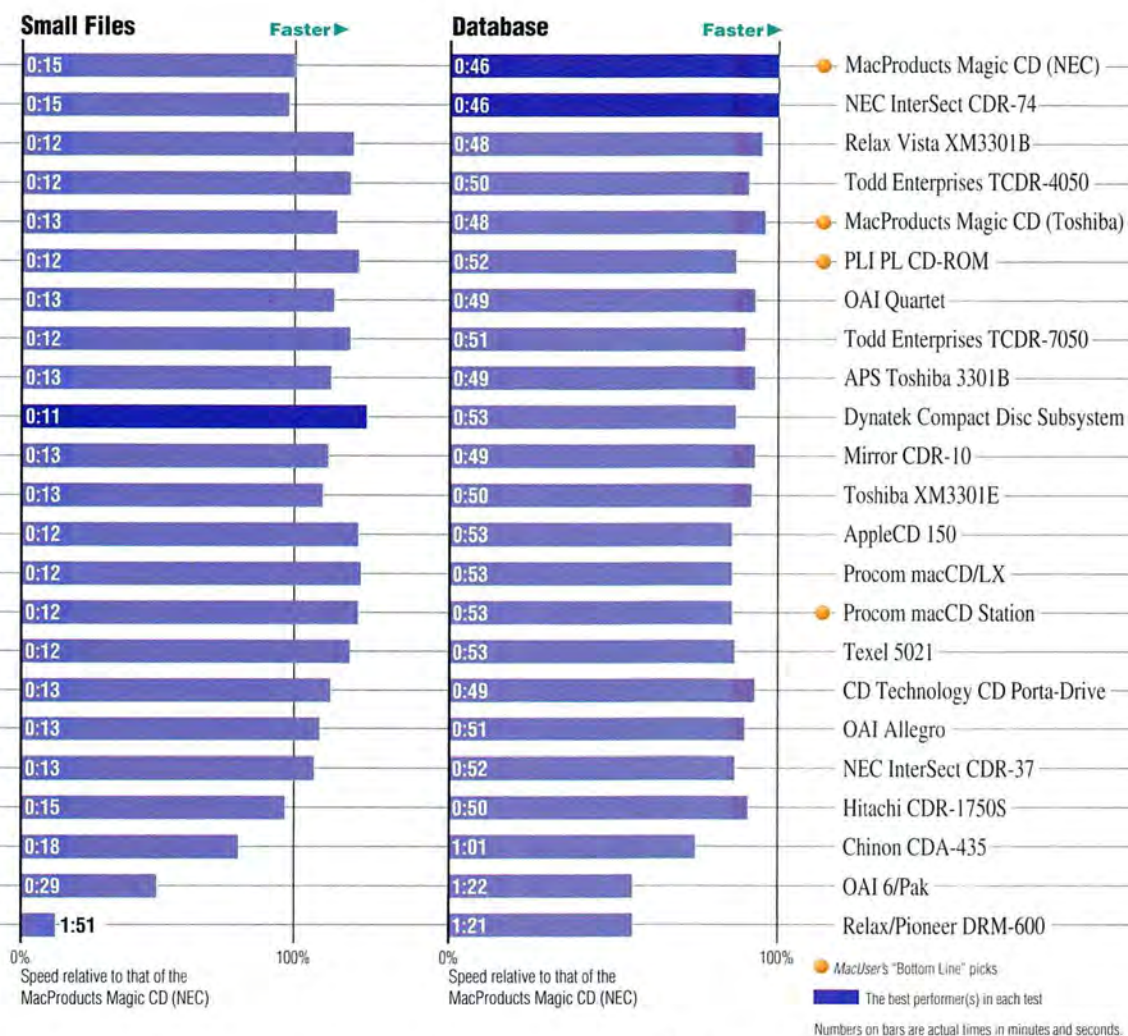
addition to the two jukebox-based drives, two other drives we tested represented multidisc alternatives. The OAI Quartet (based on a Toshiba mechanism) and the Todd Enterprises TCDR-4050 (based on a Hitachi mechanism) each contain four drive mechanisms, holding a single disc apiece.

No report on CD-ROM drives would be complete without those

using mechanisms from Toshiba, the traditional performance leader. The drives we tested included Toshiba's own XM3301E as well as Toshiba mechanisms packaged by third-party vendors: the APS Technologies Toshiba 3301B, CD Technology CD Porta-Drive, MacProducts Magic CD (Toshiba), Mirror CDR-10, OAI Allegro, and Relax Vista XM3301B.

Undeterred by Toshiba's former

dominance of the CD-ROM-mechanism performance derby, NEC has countered with a fast-throughput dual-speed breakthrough that it terms *Multispin* technology. We tested a second MacProducts drive — with the same name, Magic CD, as its Toshiba-mechanism-based entry — based on NEC's Multispin mechanism and bundled with seven CD-ROMs. NEC also ships drives under



Small Files:

We timed how long it took to turn a page in the popular multimedia children's-book-on-disc *Just Grandma and Me*. Turning a page requires accessing large amounts of data in small (6K) blocks — an activity that mimics transferring small files. The Multispin drives were outperformed by those based on Sony mechanisms. We believe that more-efficient caching algorithms provided the edge.

Database:

To compare access times, we performed a title scroll to search for the word *computer* on the New Grolier Electronic Encyclopedia disc. The Multispin drives still led the pack, but just barely. The OAI 6/Pak and the Relax/Pioneer DRM-600 were hampered by having to search their six-disc caddies to locate information.

its own name: We tested the NEC InterSect CDR-37 and the InterSect CDR-74, which uses the new Multispin technology.

Our testing revealed that, aside from the Multispin drives, speed differences among single-disc CD-ROM drives are generally small — which drive is faster greatly depends on what you're doing with it. In fact, your buying decision may depend

largely on nonperformance issues such as bundled discs, customer service, and technical support.

Starting Up the Engine

Remember: A CD-ROM drive is not a replacement for your hard drive. You can't save files to a CD-ROM or delete files from it. Instead, a CD-ROM drive provides a method for accessing data — lots of data —

from a plastic disc the same size as an audio CD. CD-ROMs can hold as much as 600 megabytes of data each — the equivalent of 832 floppy disks, or more than 300,000 pages of type — enough to hold the complete works of James Joyce and Marcel Proust, with room left for illustrations. In fact, books of all kinds are being distributed on CD-ROM, including specialized telephone books,

books for foreign-language instruction, and interactive children's books with graphics and sound. We used several of these types of disc-books to test the drives.

All CD-ROM drives work in the same way, using laser light to read optically encoded information. Data on CD-ROMs is unaffected by magnetic fields produced by office equipment (see the "A Little Light, Reading" sidebar). Although CD-ROMs are durable and unerasable, they're not indestructible; small scratches can render data unreadable. The worst thing you can do is to spin a disc on your desk — you'll create small circular scratches that will cause your CD-ROM drive to lose its way as it searches for data.

Setting up a CD-ROM drive is simple: Just add the necessary software to your System file, and hook the drive up to your SCSI chain. The software includes a driver file, a DA for playing audio discs, and several files that enable your Mac to recognize the different types of discs your drive will play.

To connect the drive to your Mac, the standard rules of SCSI apply: Terminate the first and last external SCSI devices on the chain. Use SCSI cables 1.5 to 3 feet long for the best chance of trouble-free results. Make sure the SCSI-identification number is between 1 and 6 (0 is usually reserved for the internal hard drive). And make sure no two SCSI devices have the same number.

You usually change the SCSI ID with a push-button or rotary switch. However, several of the drives we tested use DIP (dual in-line package) switches, which require you to refer to the manual to interpret the SCSI-ID number. The drives with Chinon, Hitachi, NEC, and Pioneer mechanisms all used DIP switches. It was even more difficult to change the SCSI-ID number on the NEC InterSect CDR-74, because the DIP switch was recessed 1 inch within the case.

The most difficult drive to set up,

Picturing the Future: Photo CD

Picture this: On returning from a hard-earned vacation, you hand your undeveloped film over to your favorite photo processor. A few days later, you come back to pick up your negatives, your prints, and something a little different — your Photo CD disc.

What's Photo CD? At its heart, Photo CD is an image format stored on read-only optical discs similar in appearance to CD-ROMs and audio CDs. Each image is stored in five resolutions for displaying on computer monitors, ordinary television, and HDTV (high-definition television) as well as for outputting as photographic-quality prints. The fifth resolution is that of a tiny *thumbnail* shot useful for getting an overview of all the images on the disc.

A typical Photo CD disc can hold as many as 100 digital photographs — but don't worry if you have only 24 pictures on your roll of film, because you can keep going back to your photo finisher and adding more images until the 600-megabyte disc is full.

As a photo-archiving technology for amateurs as well as for professionals, Photo CD is unparalleled: Your Photo CD disc will still be capable of producing top-quality photographic prints years after your negatives are scratched and brittle with age. And after you've had a Photo CD disc for 10 or 20 years, you can always take it in to be copied onto a brand-new disc without any degradation of the images.

Photo CD is not just for archiving. You can also add text and audio to the images, either for identification purposes or to create multimedia presentations.

Photo CD discs can be played on CD-ROM drives that have the appropriate driver software (Apple's is an extension called Photo Access). Reading text or images that have been added after the first set of photos has been put onto the

disc — called *multisession* capability — requires vendors to make minor modifications to their CD-ROM-drive hardware. Although about half the drives we tested could read the first, or original, session on a Photo CD disc, only the AppleCD 300i inside the Mac IIvx and the Performa 600 could read the additional data from a multisession disc — but expect most CD-ROM drives to have multisession capability soon.

You also need software on your Mac that can read the Photo CD format. Kodak has a simple Photo CD-viewing utility called Photo CD Access, and others are bound to appear as time goes on. More important, you can bring Photo CD images directly into Adobe Photoshop by using a plug-in from Kodak called Acquire, which lets you pick the resolution at which you'd like to bring in the images. But remember: The higher the resolution, the slower Photoshop will be.

Is Photo CD just another fly-by-night fad or high-end toy? If the level of interest shown by the computer and photography industries is any indication, probably not. Photography giants Agfa, Fuji, and Polaroid — to name a few — have signed on to support the technology.

Photo CD is not just a Mac technology. Photo CD discs can also be played on PCs with CD-ROM XA-compatible hardware and software (CD-ROM XA is a PC standard that enables a PC CD-ROM drive to play multimedia discs) as well as on consumer-level machines, such as Kodak's Photo CD players (starting at less than \$500) and Philips' CDI players (starting at less than \$1,000), each of which plugs in to a television for display. And the cost of putting images on Photo CD discs is reasonable — around \$1 to \$2 per image, depending on the type of film you have. To locate a Photo CD photo finisher near you, call Kodak at 800-242-2424.

however, was the Todd Enterprises TCDR-4050, which came as an unassembled kit with only a two-page manual. The potential benefit of this modular system is that you can choose your own configuration of one to four mechanisms in a single cabinet. But you don't save any money for your trouble — the drive is not among the least expensive.

We also looked inside these drives to check for FCC certification. All

computer peripherals — CD-ROM drives, hard-disk drives, and printers — should have a sticker from the FCC somewhere on the inside. The MacProducts Magic (Toshiba), both drives from Todd Enterprises, and the Texel 5021 had no stickers at the time we looked at them.

In general, we found the drives based on the Sony and Toshiba mechanisms to be the best designed and to come with the best external

switches, indicators, and connectors. Our overall-favorite drive during the setup phase of our evaluation was the Procom macCD Station. It's the most complete system — coming with seven CD-ROMs, good documentation, headphones, and speakers — and is also generally well designed. Other drives that deserve praise in terms of setup are the MacProducts Magic CD (Toshiba); Mirror CDR-10; OAI Allegro; and PLI PL CD-ROM, which is well documented and well designed.

Taking It for a Spin

Once your drive is connected, you can start using it by putting a disc into a cartridgelike caddy, which you then insert into the front of the drive. Only one drive, the NEC InterSect CDR-37, doesn't require a caddy. Instead, you lift a lid similar to that of a portable audio-CD player and place a disc in the drive. One drawback of this design is that you can't eject the disc; you must lift the lid and remove the disc manually.

As with floppy-disk drives — or other removable-media drives such as SyQuest, Bernoulli, or erasable optical drives — you eject a disc by dragging the CD-ROM icon to the Trash (except in the case of the NEC InterSect CDR-37 described above). Unfortunately, the Finder does not treat (optical) CD-ROMs exactly the same way it treats (magnetic) floppy disks. One annoying "feature" of System 7 is that you can't eject a removable disc such as a CD-ROM if you have file sharing turned on and if a CD-ROM is in the drive when you boot your system (see the "Serving Up the Platter" sidebar). Even if you're not sharing any files or folders on the CD-ROM, you have to turn file sharing off before your Mac will let you eject your disc.

Sharing is part of the nature of CD-ROM, and you can share your SCSI-based CD-ROM drive with PC users as long as the appropriate driver software is installed on the PC. Several vendors offer driver software

On the Horizon

CD-ROM discs store huge amounts of information, but the major drawback has always been how slowly CD-ROM drives get all that data into your Mac. However, new technology is emerging that promises to greatly improve drives' speed.

Although too late to be included in our testing, several products are now shipping that combine a one-two punch of performance improvements. First, they can get to the data faster: Access times have improved to as little as 200 milliseconds. Second, once the drives have found the data, they can transfer it into your Mac as much as twice as fast as older drives, using dual-speed technology that spins the CD-ROM twice as fast as previously. The Chiron CDA-535 (\$795), Mirror CD-ROM Drive (\$599), Texel DM-5024 (\$679), and Toshiba XM3401E (\$1,010) can transfer data at 300K per second and audio at 150K per second. Each is an external drive, ready to be connected to your Mac.

Sony produces the dual-speed mechanism used in the AppleCD 300i, inside the Mac IIvx and Performa 600. Apple also sells an external version of this drive called the AppleCD 300 (\$599). As we went to print, Sony was packaging this mechanism as an external drive only for the PC and was still deciding whether or not to make its external drive compatible with the Mac. Sony Computer Peripheral Products Co., 655 River Oaks Parkway, San Jose, CA 95134; 800-352-7669 or 408-432-0190.

Not only are these new drives speedier but they also allow you to use Kodak's Photo CD more efficiently, because they are multi-session-capable—they can access photos added to a Photo CD disc after the first session.

— Nancy Peterson

for the PC as well as for the Macintosh, and third-party vendors such as Corel also offer PC driver software. In any case, be sure to specify which types of machines you'll be using with the CD-ROM drive when you purchase it.

There are also CD-ROMs that can be used by Mac as well as PC users. All the drives we tested proved to be compatible with the *ISO 9660 standard*, which lets Macs, PCs, and some

UNIX workstations share data on CD-ROMs. ISO-9660-compatible discs often come with a single set of data and two sets of data-access software, one set for Macs and one for PCs. However, a non-ISO-9660 disc can also be used with Macs as well as PCs if the manufacturer includes two complete sets of data on the disc, one for Macs and one for PCs.

In addition to playing PC discs, all CD-ROM drives can also play audio CDs. Just insert the audio CD into the caddy as you would a CD-ROM. You start and stop the music and control which track to play through an audio DA — the best audio-control software we found came with the drives from OAI and Procom. To listen to an audio CD, you need either headphones (all the drives we tested have headphone jacks) or external speakers, because an audio-CD signal cannot travel over SCSI to come out of your Mac's speaker. Manufacturers such as Altec Lansing, Bose, and Sony sell excellent small speaker pairs with their own power supplies.

Many drives also have *RCA jacks* — industry-standard connections for output to speakers, useful for multimedia presentations. (Procom even includes a pair of small speakers with its macCD Station.) All the drives we tested feature rotary volume dials, which offer more control than the three- or four-position volume switches of the old-style drives based on the Toshiba mechanism.

The hottest new medium you can use with your CD-ROM drive is a Photo CD disc (see the "Picturing the Future: Photo CD" sidebar). Photo CD is a technology for archiving photographs in digital form at several resolutions for output to video monitors and photo-quality printers. Getting a Photo CD disc is as easy as sending your undeveloped film to Kodak; along with your pictures, you get back a disc that contains your pictures. The disc can hold as many as 100 images in all.

Like other types of information on

CD-ROMs, Photo CD images can't be erased. Unlike with a standard CD-ROM, however, you can add more images to a Photo CD disc after the original disc has been created. A disc that has been written to more than once is called *multisession*. About half the drives we tested were able to read Photo CD images, but none of the *external* drives was able to read past the first session on multisession discs, although the AppleCD 300i inside the Mac IIvx and the Performa 600 could. This situation is changing, however, and many vendors are expected to have multisession-capable CD-ROM drives by the time you read this (see the "On the Horizon" sidebar).

Speed Testing

Using a variety of software applications to measure the speed with which the drives read discs (see the "How We Tested CD-ROM Drives" sidebar and Figure 1), we found the drives' speed to be even closer than they were in our CD-ROM reports of previous years (see "Is It Time for CD-ROM?" June '91, page 150, and "Most Valuable Players," March '90, page 150). CD-ROM drives fall basically into two camps: traditional drives and dual-speed drives (the AppleCD 300i inside the Mac IIvx and drives with an NEC Multispin mechanism).

Unlike a hard disk, which spins at constant *rotational* speed, a CD-ROM spins at a constant *linear* speed (see the "A Little Light, Reading" sidebar), so that the single spiral track always passes under the laser at the same speed. This means that the disc is spinning faster near the center than at the outer edge, where more track passes under the head in a single revolution than it does at the center. NEC's Multispin technology increases throughput by making the disk spin at two linear speeds: one for audio and one that's twice as fast for data. The dual-speed technology used in the Sony mechanism works in the same way.

How We Tested CD-ROM Drives

ZD Labs tested each CD-ROM drive with a Mac IIci that had 8 megabytes of RAM, an 80-megabyte Quantum hard drive, a cache card, and a 13-inch AppleColor High-Resolution Monitor driven by on-board video. We configured each test machine with System 7.0.1 and System 7 Tune-Up 1.1.1. Virtual memory and AppleTalk were turned off, 32-bit addressing was enabled, the disk cache was set to default, and the video was set to 256 colors.

We used Just Grandma and Me, an interactive-CD-ROM multimedia book from Brøderbund, to test how each drive handled many requests for small amounts of data. We noted the time required to turn pages in the book, each page turn loading many small blocks of data into memory. Shorter times indicated greater efficiency.

To test the sustained data-transfer rate, or *throughput*, of each drive, we used Adobe Photoshop 2.01 to open a 12.5-megabyte TIFF file from CD-ROM. For this purpose, we created our own test CD-ROM: ZD Labs delivered a hard drive containing hundreds of megabytes of data to OMI (Optical Media International), in Los Gatos, California. OMI maintains a CD service bureau and provided us with several one-off CD-ROMs.

To test each drive's ability to access small blocks of data, we used the 1991 edition of the New Grolier Electronic Encyclopedia CD-ROM. We performed a

search for the word *computer* and then measured the time required to scroll through the resulting list of 344 titles. Scrolling through this list requires the application to look up each title in a database, testing how quickly a drive can locate scattered pieces of information on a disc.

To test compatibility with other common non-Mac CD-ROM formats, we tried mounting and accessing ISO 9660 CD-ROMs; these CD-ROMs use a file format readable on multiple platforms. We also tried mounting and accessing single- and multisession Photo CD discs.

ZD Labs also evaluated issues such as packaging, design, and support. We examined each drive for position and type of volume control, headphone jack, audio output, SCSI connectors, SCSI-ID switch, and termination. The quality of the drive case was also noted.

We read the documentation for each drive, checking it for thoroughness, readability, and helpfulness and noted the length of the standard warranty, extended-warranty options, money-back guarantees, toll-free support numbers, and guaranteed turnaround times for repairs. To test each company's technical support, we made three anonymous calls to each company, seeking solutions to common CD-ROM-related problems. We noted how long it took to receive an answer and whether the answer was correct.

—Jeff Davis

We found that the Multispin technology provided better *throughput* (the rate of transfer of data from the disc to the Mac) when running applications, such as Photoshop, that access data in large blocks. In these cases, we didn't see a doubling of speed, but we did see an increase of about 50 percent.

However, drives based on NEC's Multispin were only slightly faster than standard-speed drives when an application made numerous small disc accesses, such as with the database on the New Grolier Electronic Encyclopedia disc. The Multispin drives fared relatively poorly when we executed page turns on Brøderbund's interactive children's multimedia disc Just Grandma and Me. The fastest drives in the latter case

were those from Apple, Dynatek, PLI, and Procom.

Remember, *fast* is a relative term, and no CD-ROM drive performs anywhere near as fast as your hard drive when accessing data. However, software utilities that can improve CD-ROM drive performance are available. SpeedyCD, from Shirt-pocket Software, of Mesa, Arizona, transfers all the Finder information to a database on the hard disk, so that functions such as opening windows and finding files happen in a snap—all for a suggested retail price of \$70. You still retrieve data at the slower speed of the CD-ROM drive, however. CD-ROM ToolKit, a \$79 utility from FWB, of San Francisco, is a utility that also speeds up searches and seeks; it does so by caching and

prefetching repeatedly used information from the CD-ROM to your Mac's hard disk or RAM.

Two utilities that take the wait out of finding files on CD-ROMs are available in Library 1 of ZiffNet/Mac's Download & Support Forum (just type GO ZMC:DOWNTECH). CatFinder (CATFIN.SIT) maintains disc catalogs on your hard disk (shareware, \$25; 76K). Ghost (SCOTTS.SEA), one of four utilities in Scott's MiniGrinders, lets you create your own catalogs (graveyards) of the files and folders you want (freeware; 58K).

Nobody's Perfect

In a perfect world, you'd never have any problems with your CD-ROM drive, which would work flawlessly forever. Because SCSI devices are rarely trouble-free, however, you may need to call the vendor to ask if green smoke should normally emanate from your drive. The vendor won't be much help if you get stuck in telephone-hold limbo or are told, "Yeah, they all blow green smoke."

To evaluate the quality of each company's technical support, we called each one three times with different questions, not identifying ourselves as being from *MacUser*. (Because Apple doesn't provide direct

tech support, we called an Apple dealer.) MacProducts and Procom gave the best support (see Table 1), leaving our caller on hold for the shortest time, connecting the caller to a technician rather than taking a message, and answering all three of our questions correctly. APS and PLI were the only other companies that answered all three questions completely correctly. Most of the other companies had minor failings, such as forcing us to leave a message and await a callback or putting us on hold for long periods.

Our worst experience was with Todd Enterprises, because of long waits and a failure to respond to messages. Our initial contacts with NEC and Hitachi were even worse, but there were extenuating circumstances: NEC claimed that it was moving its tech-support facilities at the time we called, and Hitachi said that it was having technical difficulties with its phone lines. We called back after these problems were resolved and got average responses, but neither company got a perfect score in answering our questions.

That's All, Folks

In past years, CD-ROM drives based on Toshiba mechanisms were the clear winners in terms of speed.

Now, however, other mechanism manufacturers have caught up. We found that drives based on Sony and Toshiba mechanisms were our favorites in overall design. We also learned that NEC's Multispin technology provided significant speed enhancements for some applications — although it was disappointing for others.

Given this, we don't think that raw speed scores should be the prime factor on which to base your purchase of a CD-ROM drive. Keep an eye out for easy setup, good technical support, and free discs. If your work involves dealing with lots of photographic-quality images, we recommend buying a multisession-capable drive that can read Kodak's Photo CD format. This multiplatform graphic ability will add usefulness to your CD-ROM drive for years to come, and it will be available soon on the latest versions of most of the products tested for this report. To compare the features of all the drives we tested, see Table 2. For our picks on which drive to buy, check out the "Bottom Line" sidebar.

John Rizzo covers CD-ROM and other technologies as a *MacUser* technical editor. **Jeff Davis**, a project leader at ZD Labs, managed the testing for this report.

Table 1: Calling All Vendors

Table 1: We made anonymous calls to each of the vendors represented in this report to find out what kind of service consumers get after purchasing a drive. The important issues were whether we reached a technical-support representative immediately; whether we were left on hold (and for how long); whether we had to leave a message and be called back (and how long that took); and, of course, whether our questions were answered correctly. Our questions and the correct answers were as follows:

Q. I put in a CD-ROM, and nothing happened.

A. You failed to install the driver software.

Q. I connected the drive to my SCSI chain, and when I boot, all I get is a question mark.

A. The CD-ROM drive is set to the same ID as the external hard drive.

Q. I tried to eject a CD-ROM, and my Mac says it can't, because it's shared.

A. Turn System 7 file sharing off, and eject the CD-ROM.

Key

Excellent
Good
Fair
Poor



continues ►

The Bottom Line

Choosing the best CD-ROM drive used to be a simple matter of choosing the drive that was the least slow. Fortunately, most drive manufacturers have now caught up with the leaders, enabling shoppers to consider some of the other factors that make a CD-ROM drive a good investment.

With the results of our speed testing so close, we based our final ratings of the drives on how well the hardware was built and packaged, how responsive and thorough the technical support provided by the company was, and how good the price was for what you received — including bundled CD-ROMs, speakers, and other accessories.

The highest-scoring CD-ROM drive overall was the **MacProducts Magic CD** based on the NEC CDR-74 Multispin mechanism (\$499 direct). This drive scored better than NEC's own drive based on the same mechanism, because of its superior features and technical support and because it comes bundled with seven assorted CD-ROMs.

A close second was the **Procom macCD Station** (\$845 list, \$700 street), another drive that bundles seven discs. MacProducts and Procom were also the two companies that provided the best technical support in terms of promptness and technical know-how. Although it's not a dual-speed drive, the macCD Station was faster than the NEC-mechanism-based drives in some of our tests. It also comes ready for playing audio CDs, in that it includes headphones and speakers as well as some of the best audio-control software we've seen.

We also liked the version of the **MacProducts Magic CD** based on the Toshiba mechanism (\$429 direct). Although it's not quite as fast as the version based on the NEC mechanism and it comes with only one CD-ROM, it's just as well built and well supported as its more expensive sibling — and it's one of the lowest-priced drives you can buy.

In a virtual tie with the Toshiba-mechanism-based Magic CD for the CD-ROM-drive bronze medal was the **PLI PL CD-ROM** (\$699 list, \$600 street), another drive that is very well designed and documented and is from a company that has been a maker of high-quality CD-ROM drives for many years.

Of course, many of the drives reviewed for this article are now being upgraded to include dual-speed capability or multisession Photo CD capability. One of note is the new version of the Mirror CDR-10, which began shipping with both of these capabilities at the end of 1992, after we'd finished our testing. Its good documentation, technical support, and packaging make this drive worth a close look.



It's not just speed but also features and bundled accessories, including CD-ROMs, that prompt us to recommend (clockwise from top) the MacProducts Magic CD (NEC), MacProducts Magic CD (Toshiba), Procom macCD Station, and PLI PL CD-ROM.

Table 2 Criteria

List price — The vendor's suggested retail price.

Street price — The price charged through mail order or by dealers surveyed across the U.S. in November 1992.

Mechanism — The name of the manufacturer and the model number of the CD-ROM mechanism inside the vendor's case.

Driver — The name and version number of the software that controls the CD-ROM drive's interaction with the Mac.

CD-ROMs — The names of any discs bundled with the drive.

Audio software — The name of any bundled software (usually a DA) for controlling audio CDs.

Audio-software type — The type (DA, extension, application, or HyperCard stack) of the audio software.

Photo CD-compatible — Can the drive read images written in Kodak's Photo CD format? (Note: All the drives we tested were single-session, hence those that could handle this format could read only those images written in the first session.)

Connectors (no., type) — The number of SCSI connectors on each drive and the type of each connector, by number of pins.

Termination — Whether the drive's SCSI termination is located inside the case (internal), outside the case and via a termination block (external), or switchable.

SCSI-ID selector — The type of control used for changing the SCSI-ID number.

Volume control — The type of mechanism that controls an audio CD's volume.

Preamp output — Does the drive include two RCA jacks as a preamp output?

Location — The location of the power supply, inside the case or in an external brick.

Power switch — The location of the drive's power switch.

Auto-switching — Can the drive automatically switch between American and European voltages?

AC fuse — Does the drive's power circuit have a fuse?

Fan — Does the drive have an internal fan?

Indicator lights — The functions indicated by LEDs.

Casing material — The main material (metal or plastic) used to make the case.

continues ►

Now the winner is even faster!

We've upgraded it with a new, improved processor that's 20% faster than our original award-winner.



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★★★★1/2

"The RealTech features not just a genuine Adobe interpreter, but also a PostScript Level 2 raster image processor (RIP), which earns it more than a few points for forward compatibility."

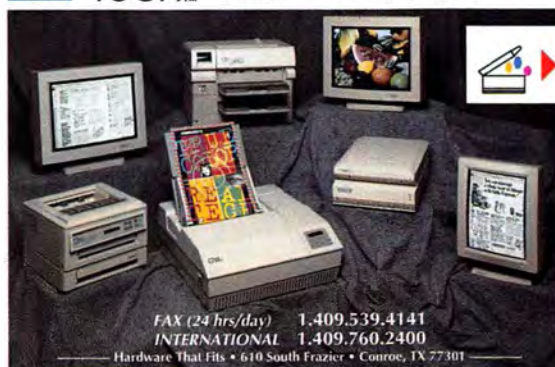
— PUBLISH MAGAZINE, February 1992

★★★★

— MACWORLD MAGAZINE, September 1992

If you need to print complex graphics on a daily basis or large quantities of high-quality, time-sensitive documents, the RealTech Laser is the ideal solution. Designed for multi-user networking and mixed-platform environments.

RealTech 300 DPI Laser Printer **\$1595.**



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CIRCLE 92 ON READER SERVICE CARD.



The RealTech Laser Printer. First of its kind, and the best value in its class. Available exclusively through Hardware That Fits.

Based on its ranking in an impartial test of performance, the RealTech Laser was chosen for MacUser's cover. For complete information see MacUser, September 1992 issue.



abcdefghijklmnopqrstuvwxyz123456789011@#%&'()*~+-_`=|{|}~`abcdefghijklmnopqrstuvwxyz123456789011@#%&'()*~+-_`=|{|}~`abcdefghijklmnopqrstuvwxyz123456789011@#%&'()*~+-_`=|{|}~`abcdefghijklmnopqrstuvwxyz123456789011@#%&'()*~+-_`=|{|}~`

72agQ&72&

- Adobe PostScript® Level 2
- SCSI port
- 9 pages per minute
- 300 dpi
- 2 Mb of RAM, expandable to 10 Mb
- Optional 2nd paper drawer and envelope feeder
- Easy-to-install consumables
- Cross-platform; compatible with PCs

HARDWARE THAT FITS

For more information, call:

1-800-864-REAL

Table 2: Features of CD-ROM Drives

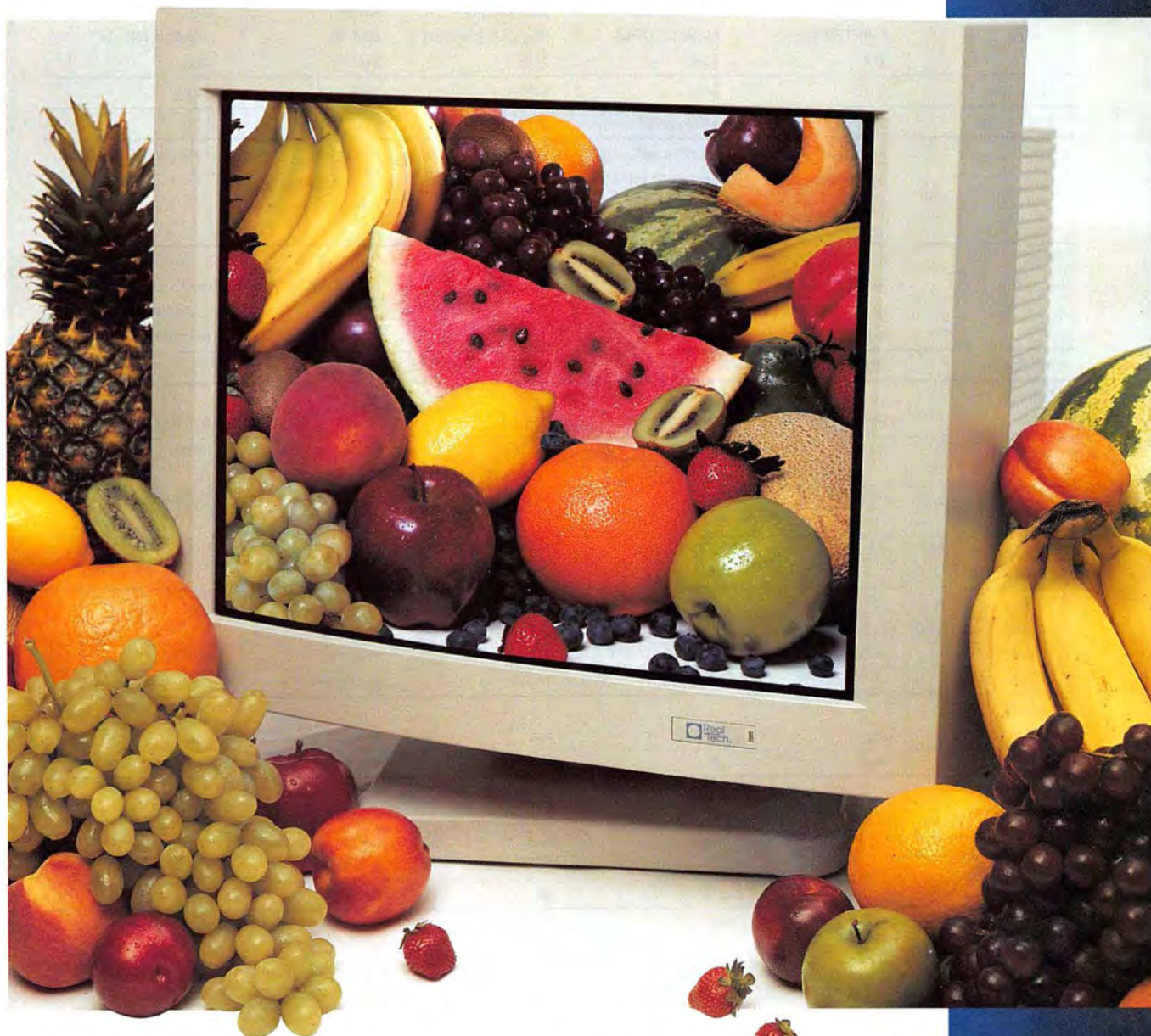
● = yes ○ = no	Apple AppleCD 150 \$\$\$%	APS Toshiba 3301B \$\$\$%	CD Technology CD Porta-Drive \$\$\$	Chinon CDA-435 \$\$\$	Dynatek Compact Disc Subsystem \$\$\$
List price	\$549	\$499	\$795	\$845	\$995
Street price	\$475	\$499 (direct)	\$585	\$550	\$795*
Pros	Photo CD-compatible.	Good tech support.	Solid performance.	Acceptable performance.	Solid performance. Photo CD-compatible.
Cons	No direct tech support.	Not Photo CD-compatible.	No bundled CD-ROMs. Not Photo CD-compatible.	Not Photo CD-compatible. SCSI-ID selection difficult.	Relatively expensive. No bundled CD-ROMs.
Mechanism	Sony CDU-541	Toshiba XM3301E1	Toshiba XM3301B	Chinon CDA-435	Sony CDU-541
Software					
Driver	Apple 3.2	OMI 1.4.3	OMI 1.4.3	Chinon 4.35	OMI 1.4
CD-ROMs	Apple CD Sampler, Nautilus Intro	Nautilus Intro	none	Selectware Demo, Lens Cleaning Disc	none
Audio software	CD Remote	CD Remote	playCD	Chinon CD Control	playCD
Audio-software type	DA + extension	DA + extension	HyperCard stack	DA	HyperCard stack
Photo CD-compatible	●	○	○	○	●
SCSI					
Connectors (no., type)	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin
Termination	external	external	external	switchable	external
SCSI-ID selector	push wheel	vertical dial	push wheel	DIP switch	push wheel
Audio					
Volume control	dial	dial	dial	dial	dial
Preamp output	●	●	●	●	○
Power supply					
Location	internal	internal	external	external	internal
Power switch	rear	rear	NA	rear	rear
Auto-switching	●	●	●	○	●
AC fuse	○	○	○	○	●
Case					
Fan	○	○	○	○	●
Indicator lights	power, access	power, access	power†, access	power, access	power, access
Casing material	metal	plastic	metal	metal	plastic
Weight	6.4 lb	4.4 lb	3 lb	5.5 lb	7.3 lb
Size (L x W x H)	12.75 x 7 x 2 in.	9.5 x 9 x 3 in.	9 x 6 x 2.5 in.	10 x 6 x 2 in.	10 x 10 x 3 in.
Warranty					
Length	1 year	1 year	2 years	1 year	1 year
Extended available	●	○	○	○	○
Money-back guarantee	○	●	○	○	○
Company	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 800-538-9696 408-996-1010 408-974-6412 (fax)	APS Technologies 2900 S. 291 Hwy. Independence, MO 64057 800-235-2750 816-478-8300	CD Technology 766 San Aleso Ave. Sunnyvale, CA 94086 408-752-8500 408-752-8501 (fax)	Chinon America 615 Hawaii Ave. Torrance, CA 90503 800-441-0222 310-533-0274 310-533-1727 (fax)	Dynatek 15 Tangiers Rd. Toronto, ON M3J 2B1 Canada 416-636-3000 416-636-3011 (fax)

*Dynatek declined to provide dealer information and gave us this street-price estimate instead.

†Power indicator is located on power supply.

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RealTech 20" Trinitron Monitor. 24-bit color, with multi-mode and auto-sync capabilities. Available exclusively through Hardware That Fits.



The RealTech 20" Trinitron® Monitor: the perfect solution for desktop professionals who need to view photorealistic color. Ideal for graphics-intensive applications. Compatible with all Macintosh CPUs that have on-board video.

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from scan to view to print

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Color 350 Color Printer	\$5,995.
Scan 800 Color Scanner	\$1,199.
Laser Printer	\$1,595.
Laser 400 Printer	\$3,195.

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- 1024x768 standard resolution
- Auto-syncing (640x480, 832x624, 1024x768, 1152x870)
- Macintosh CPU-ready
- Compatible with Radius, RasterOps, RealTech & SuperMac video cards

HARDWARE THAT FITS

CIRCLE 93 ON READER SERVICE CARD.

Table 2: Features of CD-ROM Drives, continued

● = yes ○ = no	Hitachi CDR-1750S \$\$\$	MacProducts Magic CD (NEC) \$\$\$\$	MacProducts Magic CD (Toshiba) \$\$\$\$	Mirror CDR-10 \$\$\$½	NEC InterSect CDR-37 \$\$\$
List price	\$915	\$499	\$429	\$599	\$499
Street price	\$590	\$499 (direct)	\$429 (direct)	\$599 (direct)	\$415
Pros	Acceptable performance.	Excellent tech support. Best overall performance. Ample bundled CDs. Photo-CD compatible.	Excellent tech support. Easy setup. Solid performance.	Good packaging. Easy setup. Solid performance.	Solid performance.
Cons	No bundled CD-ROMs. Not Photo CD-compatible. SCSI-ID selection difficult. Poor packaging.	SCSI-ID selection difficult.	Not Photo CD-compatible.	Not Photo CD-compatible.	No bundled CD-ROMs. Not Photo CD-compatible. SCSI-ID selection difficult.
Mechanism	Hitachi CDR-1750S	NEC CDR-74	Toshiba XM3301B	Toshiba XM3301B	NEC CDR-37
Software					
Driver	Hitachi 1.30	NEC 2.25	OMI 1.4	Trantor 1.33	NEC 2.25
CD-ROMs	none	7 assorted	Mac Animation Showcase	Nautilus Intro	none
Audio software	Hitachi CD-DA	Music Box	playCD	Music Box	Music Box
Audio-software type	DA	DA	HyperCard stack	DA	DA
Photo CD-compatible	○	●	○	○	○
SCSI					
Connectors (no., type)	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin	1, 50-pin
Termination	switchable	external	external	external	switchable
SCSI-ID selector	DIP switch	DIP switch	push wheel	push wheel	DIP switch
Audio					
Volume control	dial	dial	dial	dial	dial
Preamplifier output	●	●	○	●	●
Power supply					
Location	internal	internal	internal	internal	external
Power switch	front	front	rear	rear	side
Auto-switching	○	○	○	●	○
AC fuse	○	○	●	●	○
Case					
Fan	○	○	●	○	○
Indicator lights	power, access, disc in	power, access	power, access	access	power, access
Casing material	metal	metal	metal	metal	plastic
Weight	9.9 lb	7.7 lb	7.75 lb	12 lb	2.2 lb
Size (L x W x H)	12.75 x 9 x 2.5 in.	10 x 9 x 3 in.	9.5 x 8.5 x 2.75 in.	11 x 9.75 x 2.5 in.	9 x 5.5 x 2 in.
Warranty					
Length	1 year	1 year	1 year	1 year	2 years
Extended available	○	○	○	●	●
Money-back guarantee	○	●	●	● (30 days)	○
Company	Hitachi America 3890 Steve Reynolds Blvd. Norcross, GA 30093 800-448-2244 404-279-5600	MacProducts USA 608 W. 22nd St. Austin, TX 78705 512-472-8881 512-499-0888 (fax)	MacProducts USA 608 W. 22nd St. Austin, TX 78705 512-472-8881 512-499-0888 (fax)	Mirror Technologies 2644 Patton Rd. Roseville, MN 55113 800-654-5294 612-633-4450 612-633-3136 (fax)	NEC Technologies 1255 Michael Dr. Wood Dale, IL 60191 800-388-8888 708-860-9500 800-366-0476 (fax)

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The RealTech Scan 800 & 1200. Scans flat art and transparencies (with Transparency Option). Available exclusively through Hardware That Fits.



Now you don't have to buy two separate scanners for reflective art and transparencies. And the quality is so good you can actually use the separations for printing. We did!*



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from scan to view to print

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15" Grayscale Monitor \$449.
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Laser 400 Printer \$3195.

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- 24-bit color or 8-bit grayscale
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- Fast scanning speed (9.1 seconds at 300 dpi grayscale; 75 seconds for color)
- Includes ScanMatch color calibration software

HARDWARE THAT FITS

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CIRCLE 94 ON READER SERVICE CARD.

* The party picture shown above originated as an 8x10 color transparency. It was scanned on the RealTech Scan 800 (with Transparency Option), adjusted with ScanMatch color calibration software, and color-corrected with Adobe Photoshop.

Table 2: Features of CD-ROM Drives, continued

● = yes ○ = no	NEC InterSeCT CDR-74 \$\$\$½	OAI 6/Pak \$\$\$½	OAI Allegro \$\$\$½	OAI Quartet \$\$\$½	PLI PL CD-ROM \$\$\$\$
List price	\$725	\$1,395	\$799	\$3,195	\$699
Street price	\$615	\$1,180	\$665	\$2,500 [§]	\$600
Pros	Good performance. Photo CD-compatible.	Good tech support. Photo CD-compatible. Six-disc jukebox caddy.	Good tech support and packaging. Solid performance. Easy setup.	Good tech support. Solid performance. Four mechanisms in one case.	Good tech support. Easy setup. Photo CD-compatible.
Cons	No bundled CD-ROMs. SCSI-ID selection very difficult.	Slow. SCSI-ID selection difficult.	Not Photo CD- compatible.	Not Photo CD- compatible.	
Mechanism	NEC CDR-74	Pioneer DRM-600	Toshiba XM3301B	Toshiba XM3301B	Sony CDU-541
Software					
Driver	NEC 2.25	SuperCache 1.0	SuperCache 1.5	SuperCache 1.5	Trantor 1.27
CD-ROMs	none	Nautilus Intro	Nautilus Intro	Nautilus Intro	Nautilus Intro
Audio software	Music Box	Access CD Player	Access CD Player	Access CD Player	Music Box
Audio-software type	DA	DA	DA	DA	DA
Photo CD-compatible	●	●	○	○	●
SCSI					
Connectors (no., type)	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin
Termination	external	external	external	external	switchable
SCSI-ID selector	DIP switch	DIP switch	push wheel	push wheel	dial
Audio					
Volume control	dial	dial	dial	dial	dial
Preamp output	●	●	●	○	●
Power supply					
Location	internal	internal	internal	internal	internal
Power switch	front	rear	rear	rear	rear
Auto-switching	○	●	●	●	●
AC fuse	○	○	○	○	●
Case					
Fan	○	○	○	●	●
Indicator lights	power, access	power, access, audio	power, access, audio	power, access, audio	access
Casing material	metal	metal	plastic	metal	metal
Weight	7.7 lb	11.7 lb	6.2 lb	22.2 lb	6.2 lb
Size (L x W x H)	10 x 9 x 3 in.	15 x 8.25 x 4.5 in.	11 x 10 x 2.5 in.	12 x 7.5 x 12.5 in.	10 x 10 x 2.5 in.
Warranty					
Length	2 years	1 year	1 year	1 year	1 year
Extended available	●	●	●	●	●
Money-back guarantee	○	●	●	●	● (30 days)
Company	NEC Technologies 1255 Michael Dr. Wood Dale, IL 60191 800-388-8888 708-860-9500 800-366-0476 (fax)	OAI (Optical Access Int'l.) 800 W. Cummings Pk. #2050 Woburn, MA 01801 800-433-5133 617-937-3910	OAI (Optical Access Int'l.) 800 W. Cummings Pk. #2050 Woburn, MA 01801 800-433-5133 617-937-3910	OAI (Optical Access Int'l.) 800 W. Cummings Pk. #2050 Woburn, MA 01801 800-433-5133 617-937-3910	PLI (Peripheral Land, Inc.) 47421 Bayside Pkwy. Fremont, CA 94538 800-288-8754 510-657-2211 510-683-9713 (fax)

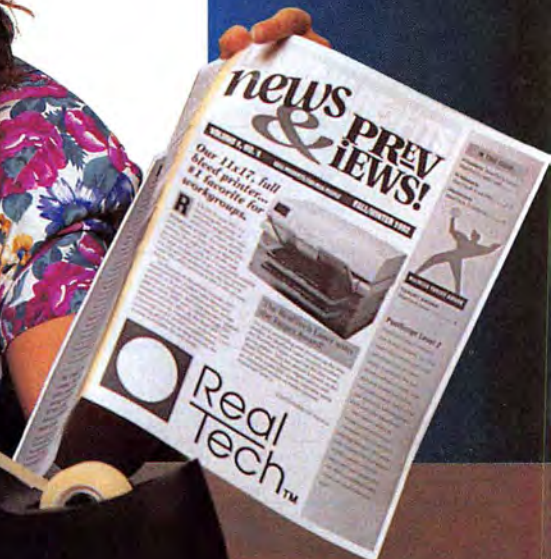
[§]At press time, OAI sold this unit directly only; this is the company's estimate of dealer street price.

Our 11x17 printer is guaranteed to make you smile, too.



— MACWORLD MAGAZINE
September 1992

Jeanne is thrilled that she doesn't have to fiddle around and tape pages together anymore.
No more tiling!
No more cut-and-taped mockups!



RealTech Laser 400 Printer. Choice of 300 or 400 dpi & letter- or tabloid-size printing. Available exclusively through Hardware That Fits.

- Adobe PostScript Level 2
- High-speed printing (15 ppm—letter; 8 ppm—tabloid)
- 300 or 400 dpi
- 2 paper trays included
- SCSI port
- Full-page 11x17 printing (prints to within 5mm of edge)
- 4 Mb RAM, upgradable to 16
- Weitek RISC processor
- ATM font rendering technology
- Three interface ports (Appletalk RS-422, IBM PC parallel, and RS-232-C)
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The RealTech Laser 400. It's fast. Flexible. And configured for speedy printing of graphics-intensive documents. The ideal networking printer, and the perfect solution for multi-user printing environments.



Laser 400
300/400 dpi
Tabloid Printer

\$3195.



Complete desktop imaging, from scan to view to print

20" Trinitron Multi-mode Monitor \$1895.
17" Multi-mode Monitor \$995.
15" Grayscale Monitor \$449.
Color 350 Color Printer \$5,995.
Scan 800 Color Scanner \$1,199.
Laser Printer \$1,595.

For more information, call:

1-800-864-REAL

CIRCLE 95 ON READER SERVICE CARD.

"...be forewarned:

PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."

Quote from MacUser September 1992 issue, "Personal PostScript Printers" by Bruce Fraser.

HARDWARE THAT FITS

Table 2: Features of CD-ROM Drives, continued

● = yes ○ = no	Procom macCD Station \$\$\$	Procom macCD/LX \$\$\$½	Relax Vista XM3301B \$\$\$	Relax/Pioneer DRM-600 \$\$\$½	Texel 5021 \$\$\$½
List price	\$845	\$595	\$549	\$949	\$499
Street price	\$700	\$550	\$549 (direct)	\$949 (direct)	\$400
Pros	Excellent tech support. Easy setup. Ample bundled CD-ROMs. Photo CD-compatible.	Excellent tech support. Good packaging. Easy setup. Photo CD- compatible.	Good tech support. Good performance. Photo CD-compatible.	Good tech support. Six-disc capacity. Photo CD-compatible.	Good tech support. Solid performance. Photo CD-compatible.
Cons	Relatively expensive.	No bundled CD-ROMs.	Poor manual.	Poor packaging. Slow. No bundled CD-ROMs. SCSI-ID selection difficult.	No bundled CD-ROMs.
Mechanism	Sony CDU-541	Sony CDU-541	Toshiba XM3301B	Pioneer DRM-600	Texel
Software					
Driver	Procom 1.0	Procom 1.0	Trantor 1.36	Trantor 1.36	Trantor 1.36
CD-ROMs	7 assorted	none	Nautilus Intro	none	none
Audio software	CD Play, CD BoomBox, CD-ROM Audio	CD Play, CD BoomBox, CD-ROM Audio	Music Box	Music Box	Music Box
Audio-software type	applications, DA	applications, DA	DA	DA	DA
Photo CD-compatible	●	●	●	●	●
SCSI					
Connectors (no., type)	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin	2, 50-pin
Termination	external	external	external	internal	external
SCSI-ID selector	dial	dial	push wheel	DIP switch	push wheel ^o
Audio					
Volume control	dial	dial	dial	dial	dial
Preamp output	●	●	○	●	○
Power supply					
Location	internal	internal	internal	internal	internal
Power switch	rear	rear	rear	rear	rear
Auto-switching	●	●	●	●	○
AC fuse	●	●	○	○	○
Case					
Fan	●	●	●	○	○
Indicator lights	access	access	power, access	power, access, audio	access
Casing material	plastic	plastic	metal	metal	aluminum
Weight	6.5 lb	6.5 lb	5.5 lb	11.7 lb	7 lb
Size (L x W x H)	10.5 x 9.5 x 2.5 in.	10.5 x 9.5 x 2.5 in.	11 x 10 x 2.5 in.	15 x 8.25 x 4.5 in.	11 x 10.5 x 2.5 in.
Warranty					
Length	1 year	1 year	1 year	1 year	1 year
Extended available	●	●	○	○	○
Money-back guarantee	○	○	●	●	○
Company	Procom Technology 2181 Dupont Dr. Irvine, CA 92715 800-800-8600 714-852-1000 714-852-1221 (fax)	Procom Technology 2181 Dupont Dr. Irvine, CA 92715 800-800-8600 714-852-1000 714-852-1221 (fax)	Relax Technology 3101 Whipple Rd. Union City, CA 94587 510-471-6112 510-471-6267 (fax)	Relax Technology 3101 Whipple Rd. Union City, CA 94587 510-471-6112 510-471-6267 (fax)	Texel America 1605 Wyatt Dr. Santa Clara, CA 95054 800-886-3935 408-980-1838 408-980-1840 (fax)

^oAccording to Texel, this drive now ships with a DIP-switch SCSI-ID selector.

BigBoys

XXL HardDrives
560MB / 1 GIG / 2.1 GIG



\$1199
Focus XXL 560MB with Free Software and 5-year warranty



\$1799
Focus XXL 1GIG with Free Software and 5-year warranty



\$2749
Focus XXL 2.1 GIG with Free Software and 5-year warranty

One Gigabyte with the best package in the business
Our rugged metal case is strong & quiet. Compare with others that use cheesy plastic & thin sheetmetal to save cost! Sleek and small enough to tuck in a briefcase with enough room left for a PowerBook.

2.1 GIG XXL Big Boy
Now we're talkin' Serious Hard Drives. Two-point-one Gigabytes of performance. A spindle speed of 5400 rpm for blazing fast transfer rates. 11.5ms avg. seek time, backed up with our 5-Year drive Warranty. Call toll-free now for complete product specs! 800-538-8866

It doesn't need to be big to offer outstanding performance... Introducing the new XXL 560MB and XXL 1 Gigabyte hard drives, featuring the new ultrafast 3.5" Micropolis mechanism. Product dimensions are only 2.25" x 6" x 8.25"

6 reasons to choose a Focus XXL drive.

1 Bigger is Better lets face it, if you need 300MB now, you'll need more storage within 6 months. The cost-per-megabyte lowers dramatically as the size of the drive increases. Our 560 MB XXL costs the same as or less than other 300MB drives.

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Focus XXL Drives feature higher spindle speeds for ultrafast performance. Revving up the disk speed produces some impressive numbers: average seek times as low as 9.4ms, and sustained SCSI throughput rates approaching 4 MB/second.

3 Micropolis Performance and Full Five-Year Warranty
Our new XXL Drive Series features legendary Micropolis reliability, Free 800 Technical Support and a full Five-Year Product Warranty. Call for your XXL Drive Spec Sheets via fax.

4 Because we sell DIRECT, you get the Best Price with the Highest Value. We design, manufacture, and sell Direct to You, eliminating all the markups that 'Warehouses' and Resellers add to their prices.

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Over \$400 of FREE Award-Winning Software-
You'll use these utilities - *DiskMaker* from Golden Triangle. Microcom's *Virex*, *Citadel*, and *Complete Undelete*. Complete with registration cards & manuals.

6 30-Day Money-Back Guarantee and Free 800# Technical Support
Ordering an XXL Drive is risk free with our 'No-Questions-Asked-30-Day-Love-It-or-Return-It' 100% Satisfaction Guarantee. Call Now for Big Savings.



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CIRCLE 127 ON READER SERVICE CARD.

Table 2: Features of CD-ROM Drives, continued

● = yes ○ = no	Todd Enterprises TCDR-4050 \$\$\$½	Todd Enterprises TCDR-7050 \$\$\$½	Toshiba XM3301E \$\$\$
List price	\$4,515**	\$915	\$915
Street price	\$3,320	\$665	\$710
Pros	Solid performance. Four mechanisms in one case. Photo CD-compatible.	Solid performance. Photo CD-compatible.	Solid performance. Good packaging. Easy setup. Photo CD-compatible.
Cons	Relatively expensive. No bundled CD-ROMs. Poor tech support. Arrived unassembled.	Relatively expensive. No bundled CD-ROMs. Poor tech support.	Relatively expensive.
Mechanism	Hitachi CDR-3750	Hitachi CDR 3750	Toshiba XM3301E1
Software			
Driver	Trantor 1.36	Trantor 1.36	OMI 1.4
CD-ROMs	none	none	Nautilus Intro
Audio software	Music Box	Music Box	playCD
Audio-software type	DA	DA	HyperCard stack
Photo CD-compatible	●	●	●
SCSI			
Connectors (no., type)	2, 50-pin	2, 50-pin	2, 50-pin
Termination	switchable	switchable	external
SCSI-ID selector	DIP switch	DIP switch	vertical dial
Audio			
Volume control	dial	dial	dial
Preamp output	○	○	●
Power supply			
Location	internal	internal	internal
Power switch	front	rear	rear
Auto-switching	●	○	●
AC fuse	●	●	○
Case			
Fan	●	○	○
Indicator lights	power, access	power, access	power, access
Casing material	metal	metal	plastic
Weight	30.1 lb	7.9 lb	4.4 lb
Size (L x W x H)	16.25 x 7.5 x 12.25 in.	14 x 6 x 2 in.	9.5 x 9 x 3 in.
Warranty			
Length	2 years	2 years	1 year
Extended available	●	●	●
Money-back guarantee	○	○	○
Company	Todd Enterprises 224 - 249 67th Ave. Bayside, NY 11364 800-445-8633 718-343-1040 718-343-9180 (fax)	Todd Enterprises 224 - 249 67th Ave. Bayside, NY 11364 800-445-8633 718-343-1040 718-343-9180 (fax)	Toshiba America 9740 Irvine Blvd. Irvine, CA 92718 714-583-3110 714-583-3133 (fax)

**User may configure with one to four mechanisms. This price includes a cabinet (\$895) and four mechanisms (\$905).

Have Data, Will Travel

Ready to Plug & Play
Everything you need is included. Software, Power Adapter, all Cables and manuals.

Small Size for Portability
Sleek and compact, about the size of a stack of 12 Macintosh floppy diskettes, this modem is well suited for life on the road.

Focus 24/96 Modem + Fax Replace costly couriers and overnight mail with our small yet powerful fax+data modem. Send faxes at 9600 bps, receive at 4800 bps, send data at 2400 bps. You'll be faxing in minutes with our FREE Quicklink II and FAXsf software.

\$99⁹⁹

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CIRCLE 126 ON READER SERVICE CARD.

Strictly Business: **Workgroup Printers**

Time is money — and every business can use more of both. One of these eight network workhorses will save you time and boost your bottom line.

Waiting for the printer has become the latest spectator sport in corporate America. Every day, millions of impatient workers cluster around their office printers, arms folded, watching the output trays and wondering whether the technological revolution ever really took place.

If you or your staff spend more time waiting than working, it's time to consider a printer designed with workgroups in mind. To achieve workgroup status, a PostScript laser printer must crank out 15 or more pages per minute, be capable of printing a lot of pages per month, and speed through complex graphics. A workgroup printer should also hold at least two types or sizes of paper stock and offer software control over which paper is used for a given print job or even for specific pages of a single print job. Finally, a workgroup printer should accept print jobs from Macs as well as PCs. Simply put, a workgroup printer is ideal for busy multiplatform offices that rely on fast, reliable printing — and a lot of it.

BY BRUCE FRASER



PHOTOGRAPHY: ROSEMARY WILTON



Revving Up

A printer's speed depends on two factors: the speed of its *engine*, which puts dots of toner on paper, and the speed of the *controller*, which tells the engine where to place the dots. The relative importance of each factor depends on the type of document being printed. When you're printing text and simple graphics, engine speed is paramount, because the controller's role in preparing these documents for printing is relatively undemanding. When you're printing graphics-intensive documents, the controller's speed is much more important, because the bulk of printing time is taken up while the controller interprets and executes the PostScript code.

The power of the controller becomes even more important when the printer is capable of a higher *resolution* — measured in *dots per inch*, or *dpi* — than the standard 300-dpi resolution of most of today's laser printers. The controller is also challenged when the printer uses a *resolution-enhancement* technique to change the shape or location of the dots. High-resolution and resolution-enhanced printers demand more from a processor but create text and graphic images superior to those produced by their plain-vanilla 300-dpi cousins.

Buying a workgroup printer is more demanding than finding the right personal printer for your desktop, if only because you have to please not just yourself but also all the other members of your workgroup. To help you make the right choice, MacUser Labs rounded up eight contenders for the workgroup-printer crown. Some are best for speedy text and spreadsheet printing, some shine with complex graphics, and a few combine the best of both worlds.

Three — the Hewlett-Packard LaserJet IIISi, QMS-PS 1700, and Texas Instruments microLaser XL Turbo — handle only letter- and legal-sized paper. The remaining five

printers — the Compaq Pagemarq 15, Dataproducts LZR 1560, Hardware That Fits RealTech Laser, Mirror MirrorImage 415, and QMS-PS 2000 — add tabloid-sized paper to their repertoire. All have engine speeds between 15 and 20 ppm (pages per minute), and all have controllers that feature RISC (reduced-instruction-set computing) processors that drive true Adobe PostScript interpreters. The Compaq Pagemarq 15, Dataproducts LZR 1560, Hardware That Fits RealTech Laser, Mirror MirrorImage 415, and Texas Instruments microLaser XL Turbo all have PostScript Level 2 interpreters; the rest use PostScript Level 1. (Note: Compaq also offers the Pagemarq 20, a 20-ppm PostScript Level 2 printer with a faster RISC processor than the one in the Pagemarq 15, but it was not available when we did our testing.) All are designed for a small-to-medium-sized workgroup — generally in the range of 5 to 50 users, depending on demand.

Despite their similarities, the eight contestants differ widely in the features they offer, the quality of their output, their printing speed, and their prices. After a month of testing, we found that — with rare exceptions — output quality is inversely proportional to speed: The best output takes the longest to produce, and the fastest output looks the worst. However, we discovered that two workgroup printers — the Compaq Pagemarq 15 and the Hewlett-Packard LaserJet IIISi — offer an excellent compromise between speed and print quality.

Zero to Sixty

Workgroup printers are built for speed. No one wants a crucial presentation stuck behind the company accountant's quarterly report, chugging along at a leisurely 8 ppm — the speed of all of Apple's LaserWriters, even the brand-new Pro 600 and Pro 630.

To test how fast this month's workgroup printers could churn out

Inside a Workgroup Printer



1. PostScript Commands

The application sends QuickDraw code to the printer-driver software, which translates it into PostScript code.

10. Cleanup

After the image has been fused, an *eraser lamp* neutralizes the charged drum and prepares it for a fresh exposure.

9. Saving Excess Toner

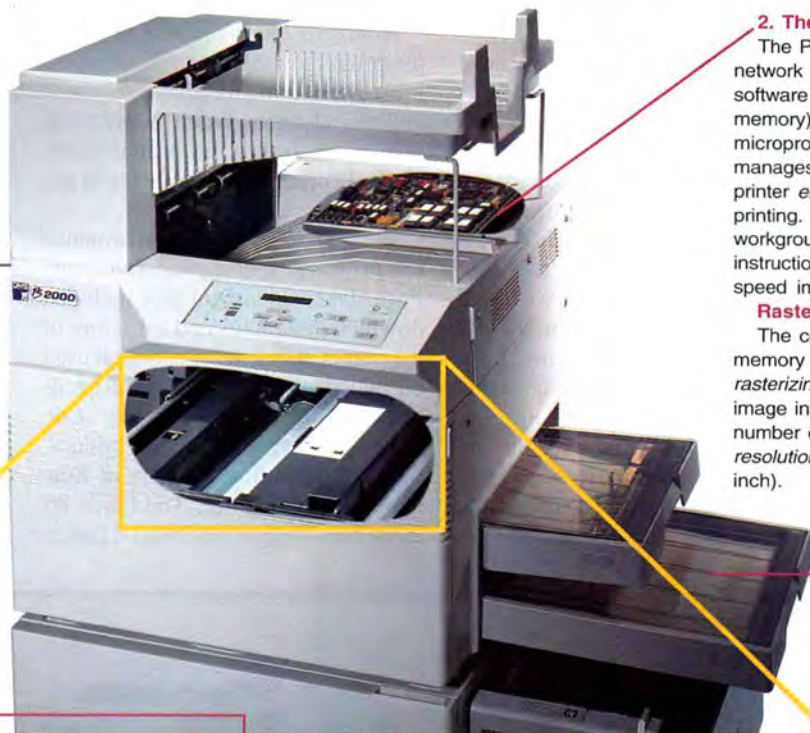
A lip on the drum unit scrapes excess toner particles from the drum into a receptacle.

8. Fusing the Image

Heat rollers and pressure rollers in the fusing assembly fuse the toner to the paper.

7. Removing the Charge

A *discharge brush* removes the electrical charge from the toner and the paper.



2. The Controller

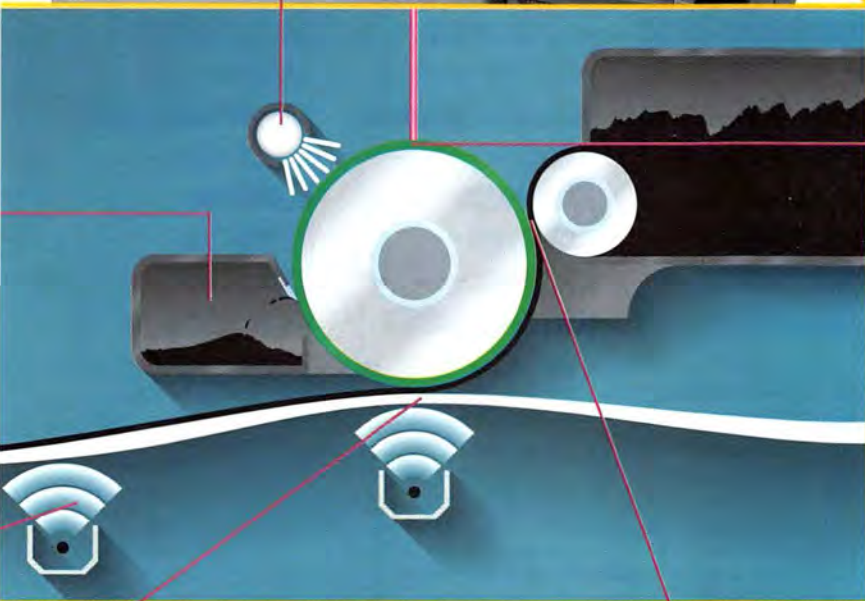
The PostScript code is sent over the network to the PostScript *interpreter*, software resident in ROM (read-only memory) in the printer's *controller*. The microprocessor-powered controller manages both the interpreter and the printer *engine*, which does the actual printing. The controllers in most workgroup printers use RISC (reduced-instruction-set computing) processors to speed image processing.

Rasterization

The controller buffers the image into memory before the interpreter begins the *rasterizing* process, which converts the image into a dot pattern for printing. The number of dots depends on the printer's *resolution*, measured in dpi (dots per inch).

3. Selecting the Paper

A command from the printer driver tells the controller which *input tray* it should choose — most workgroup printers have multiple input trays. Paper from that tray is grabbed by *pickup rollers* and fed into the printer's *paper path*.



4. Charging the Drum

Once the entire image has been rasterized, the printer's controller directs a rotating mirror that deflects a pulsing laser beam to trace the image's dot patterns onto the *organophotoconductor*, or OPC, often referred to simply as the *drum*, placing a positive charge on the areas to be printed.

6. Putting It on Paper

An electrically charged wire, or *transfer corona*, pulls the toner particles off the drum onto a sheet of paper passing between the drum and the wire.

5. Applying Toner

As the drum rotates, it passes a second drum coated with *toner powder* that has been transferred to it from the *toner reservoir*. The toner particles, which are positively charged, adhere to the first drum's negatively charged areas.

a typical office document, we first printed a 50-page Microsoft Word document, using a single *printer-resident* font (a font installed in the printer's ROM, or read-only memory). As we expected, the printers ranked more or less in order of engine speed (see Figure 1), because the processor prepares a text document as fast or faster than the engine can print it. The one significant exception was the QMS-PS 1700, which finished last, despite its 17-ppm engine. The reason is simple: At 600 dpi, the QMS-PS 1700 has to process four times as much information as do the 300-dpi leaders, the QMS-PS 2000, the Hewlett-Packard LaserJet IIISi, and the Texas Instruments microLaser XL Turbo. (A 600-

dpi image contains four times as many dots as does the same image at 300 dpi.)

The remaining four printers have a 400-dpi engine. The Dataproducts LZR 1560, the Hardware That Fits RealTech Laser, and the Mirror MirrorImage 415 are, in fact, identical, save for the logo on the front panel — differences in their performance can be traced only to variations in the individual units we tested and not to design differences. Although it uses the same type of engine, the Compaq Pagemarq 15 differs in that it uses a faster controller that offers 800-x-400-dpi resolution. Despite its higher resolution, the Compaq Pagemarq 15 finished the Word test well ahead of the 400-dpi

printers, thanks to its speedy 16-megahertz RISC-based controller.

Although the Word test revealed the printers with the fastest engines, most users don't produce only text and spreadsheets. When graphics are included in the mix, the printer's controller becomes the key factor in determining speed.

We tested graphics performance by printing a complex five-page PageMaker document that included downloadable fonts and a mixture of the graphics formats most often used on the Mac: EPS, for PostScript illustration and page layout; gray-scale TIFF images; and PICT graphics, which are familiar to users of Mac painting applications. The QMS-PS 2000 had a bigger lead than it had in

Figure 1: Thoroughbred Workhorses

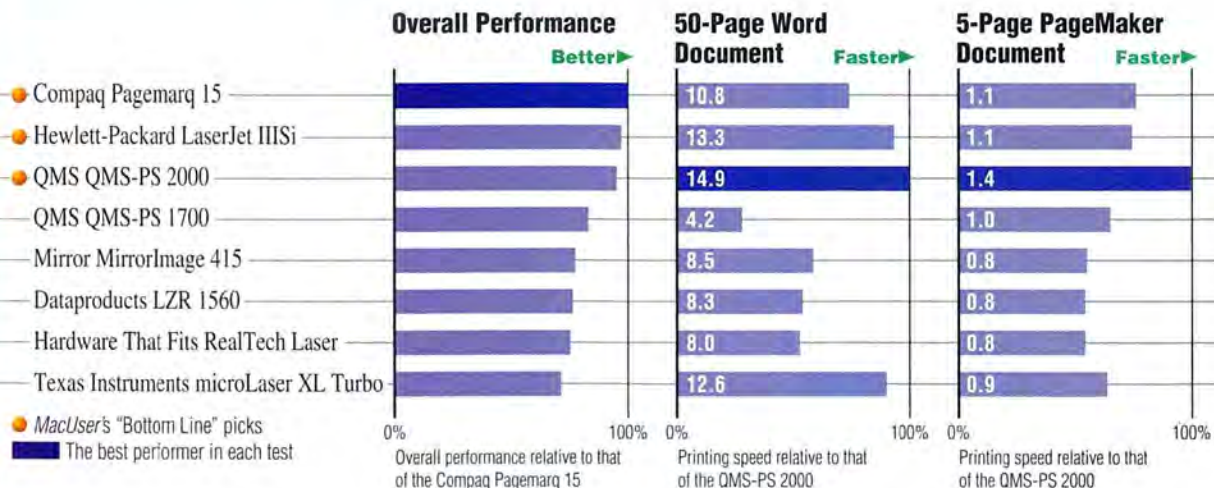


Figure 1: Engine speed, processor speed, and resolution combine to determine a workgroup printer's performance. We ran a suite of timed tests on the eight printers and compared the speed results for each printer with those of the QMS-PS 2000, the fastest printer. (This printer was also the most expensive by far.)

Next we asked a panel of printing experts to judge the image quality of each printer's output. We then weighted the results of the printing-speed and image-quality tests equally to find the overall best performer.

Overall Performance:

Engine speed, microprocessor power, and resolution combine to decide a workgroup printer's performance. The Compaq

Pagemarq 15 — although not the top performer in any one test — was the overall winner.

50-Page Word Document:

We used a 50-page Microsoft Word document to measure raw engine speed, because printing a text file barely taxes a printer's microprocessor. The QMS-PS 2000 took top honors with its 300-dpi, 20-ppm engine, followed by the Hewlett-Packard LaserJet IIISi and the Texas Instruments microLaser XL Turbo. The actual number of pages printed per minute is shown on each printer's bar.

5-Page PageMaker Document:

We created a complex PageMaker file to test how well each printer's microprocessor could handle a variety of graphic

the Word test and was followed by the Compaq Pagemarq 15 and the Hewlett-Packard LaserJet IIISi. But the QMS-PS 1700, despite its 600-dpi resolution, moved into fourth place, just ahead of the Texas Instruments microLaser XL Turbo. The QMS-PS 1700's 25-megahertz RISC-based controller is powerful enough for complex documents, despite the extra work required by 600-dpi printing.

For our final speed test, we set up a small network with five Macs and then bombarded each printer with simultaneous print jobs, much as would happen in a busy workgroup. Our main concern was to verify that each of the printers could handle a real-world-network situation. The

relative results we obtained were similar to those of the first test. All the printers slowed down except the QMS-PS 2000, which benefits from the QMS Crown Multitasking Operating System. The Crown system is sophisticated software that enhances the network performance of the QMS-PS 2000 (and the 600-dpi QMS-PS 1700) in several important ways, including the ability to accept and process subsequent pages or new print jobs while it is printing another page or document. Crown also features *input buffering*, which lets the two QMS printers accept data simultaneously through all ports — a useful feature when your network includes Macs as well as PCs and a PC is accessing the printer through the

parallel or RS-232 serial port.

When we combined the results of the three tests and looked at the overall printing speed, the QMS-PS 2000 was the clear winner — 30 percent faster than the second-place Hewlett-Packard LaserJet IIISi. The Compaq Pagemarq 15 and the Texas Instruments microLaser XL Turbo were only slightly slower than the Hewlett-Packard LaserJet IIISi, and the remaining printers were significantly slower.

All four of the 400-dpi printers and the 600-dpi QMS-PS 1700 can also print at 300 dpi. The speed difference is negligible in the case of the 400-dpi printers, but the QMS-PS 1700 is about 10 percent speedier at 300 dpi than at its default 600 dpi.



challenges. Again, the QMS-PS 2000 had the edge — but it had to process only 300-x-300-dpi's worth of information, compared with the 800-x-400-dpi that the Compaq Pagemarq 15 had to process and the 600-x-600-dpi that the QMS-PS 1700 had to deal with. The actual number of pages printed per minute is shown on each printer's bar.

Network Printing:

We hooked each printer up to a five-Mac network and simultaneously printed 10-page Word documents from each Mac to test each printer's speed when accepting multiple print jobs from a busy network. Once again the QMS-PS 2000 outpaced the field, due in part to its Crown Multitasking Operating System, which speeds network performance.

Image Quality — Text:

When printing text, the 800-x-400-dpi Compaq Pagemarq 15 tied with the 600-x-600-dpi QMS-PS 1700. The Pagemarq 15's horizontal resolution is 800 dpi, and horizontal resolution is more critical than vertical resolution in deciding type quality. The jury scores are on a scale of 0 to 5.

Image Quality — Graphics:

When printing gray-scale and line-art images, the true 600-dpi engine of the QMS-PS 1700 produced the crispest lines and most-even halftones. The 300-dpi Texas Instruments microLaser XL Turbo, on the other hand, fell behind all the others, including its fellow unenhanced 300-dpi printers. The jury scores are on a scale of 0 to 5.

Also, our tests didn't uncover any discernible advantages of PostScript Level 2, but we were hampered by the lack of a PostScript Level 2-aware printer driver. We expect that Apple and Adobe will deliver a driver this spring and with it — claims Adobe — a speed increase of about 20 per-cent in Level 2 printers.

Fast and Good-Looking

Speed, although desirable, isn't necessarily your only consideration when choosing a workgroup printer. Depending on your application, image quality may be as important. For those who use a printer to create camera-ready art for undemanding uses such as producing newsletters,

image quality may outweigh speed considerations.

To judge if speed takes a toll on image quality, we assembled a jury of printer experts and asked them to carefully examine unlabeled samples of each printer's output, both text and graphics. Although they thought that none of the printers produced

How We Tested Workgroup Printers

A busy network makes heavy demands on a workgroup printer. Testing such a printer therefore requires more than simply finding out how fast and how crisply it can print one document. A workgroup printer must also perform well when asked to print multiple documents simultaneously, whether those documents are being sent from a Mac or from a PC.

In the MacUser NetWorkShop, we connected each printer's LocalTalk port to a five-Mac network and its parallel port to a Compaq 33/386 PC (because the Hewlett-Packard LaserJet IIISi doesn't have multiple ports, we added the BridgePort EX, a multiport adapter card from Extended Systems, of Boise, Idaho).

To ensure consistency, we standardized on several factors: We used Mac IIci's with 80-megabyte hard drives running System 7.0.1 with Tune-Up 1.1.1. Each Mac had 8 megabytes of RAM, with the default RAM-cache setting. We used Apple's LaserWriter driver with Backgrounder — a built-in spooler — turned off to ensure that we would obtain the fastest times possible. Before each test, we printed a "break-in" page on each printer to ensure that the printer was initialized.

We performed each test three times, using a stopwatch to time the interval between when we clicked on the Print button and when the last page landed in the output bin. We calculated an average of the printing times relative to those of the QMS-PS 2000.

We used a suite of documents designed to simulate a typical workgroup user's requirements and to highlight various aspects of printer performance. First, from a single Mac, we printed a 50-page Microsoft Word document formatted in 12-point Times Roman, a printer-resident font, to test engine speed. Second, to push the printers' processors to the limit, we printed — again from a single Mac — a complex 5-page Aldus PageMaker document, complete with downloadable TrueType and Adobe Type 1 fonts; EPS, PICT,

and gray-scale TIFF graphics; type in various sizes; hairlines; and reverse text. We also used this document to judge the image quality of text and graphics produced by each printer.

To test how each printer handled the demands of a busy network, we printed a 10-page Word document formatted in 12-point Times Roman simultaneously from each of the networked Macs. We clicked on the Print button on each Mac at ten-second intervals and timed how long it took from the first click to when

the last page landed in the output bin.

Finally, we looked at the different features of each printer, such as multiple resolutions, automatic tray switching, and output-tray options. We also used the Compaq 33/386 PC and one of the IIci's to test the manufacturers' claims of port/emulation-switching capabilities by printing multiple PostScript and HP-PCL files at brief intervals and recording whether the printer performed the switching function correctly.

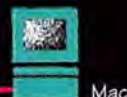
— Roman Victor Loyola

We first printed a 50-page Microsoft Word file and a complex 5-page Aldus PageMaker document from a single Mac to test each printer's engine speed and processor power.

We then installed a five-Mac network and printed a 10-page Microsoft Word file from each Mac at ten-second intervals.

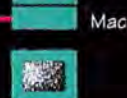
Finally, we installed a mixed local-area network that included a Compaq 33/386 PC and tested each printer that featured automatic port/emulation switching, by printing PostScript and HP-PCL files.

50-page-Word/5-page-PageMaker-document tests

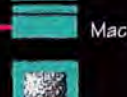


Mac

5-Mac-network test



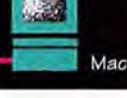
Mac



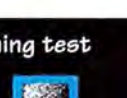
Mac



Mac



Mac



Mac

LocalTalk



Workgroup printer

Automatic-port-switching test



PC

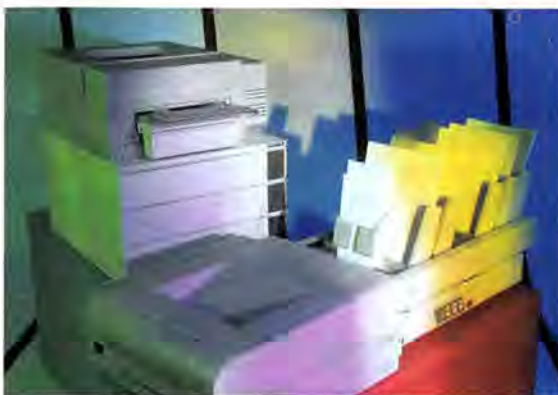
Parallel port

Feeding the LaserWriter II

If you're one of the millions of Mac users in a busy office that's saddled with an aging LaserWriter II, you may have discovered that it can't keep up with all your printing needs. If you can't afford to replace it with a new workgroup printer, we can suggest two accessories that offer at least half the benefit of a workgroup printer: the versatile paper-handling features needed to meet the demands of today's office.

The TowerFeed 444, from Dynabit, is a sophisticated sheet feeder for LaserWriter II printers, including the LaserWriter IINT, IINTX, II, and IIg. The TowerFeed is available in six models, ranging from the Model 33 (\$1,995), a desktop feeder with three letter-sized trays, each holding 500 sheets, to the Model 75 Legal (\$3,445), a floor model with two storage drawers and four letter-sized trays and one legal-sized tray, each holding 500 sheets. The TowerFeed sits underneath the LaserWriter and takes up about as much desktop space as the printer. The TowerFeed's software supports two forms of paper management: *Direct addressing* lets you assign several trays to print different pages of one document. *Virtual addressing* lets you define one tray to hold a specific type of paper — letterhead, for example — and the TowerFeed then finds that tray no matter where that paper is. Dynabit, 324 S. Hyde Park Avenue, Suite 375, Tampa, FL 33606; 813-254-6878.

The ErgoFeed, from BDT Products, is also designed for the LaserWriter II series, although it can work with some non-Apple printers. The ErgoFeed 2E (\$1,695) expands the LaserWriter's capacity to two 220-sheet paper trays, accommodating legal-size as well as letter-sized sheets. The top-of-the-line ErgoFeed 5E (\$3,595) expands your LaserWriter's paper capacity to six 220-sheet paper trays. The trays accommodate either letter- or



The Dynabit TowerFeed 444 (left) and the BDT Products ErgoFeed (right) are two powerful paper-handling options for Apple LaserWriter IIs.

legal-sized paper. Each feeder includes an envelope tray that can hold 50 business envelopes.

Unlike the TowerFeed, an ErgoFeed unit sits behind the LaserWriter, taking up extra space. The ErgoFeed also holds paper only in open, vertical input trays, whereas paper loaded into the TowerFeed lies flat in protected trays. Like the TowerFeed, the ErgoFeed lets you assign trays via direct addressing, but it does not offer virtual addressing. BDT Products, 17152 Armstrong Avenue, Irvine, CA 92714; 714-660-1386.

— Alfred Melo

bad-looking output, our jurors judged the QMS-PS 1700 to have the best overall quality — 600 dpi is noticeably better than 300 or 400 dpi. The Compaq Pagemarq 15, however, came very close in overall quality and equaled the QMS-PS 1700 in the quality of its text. The Pagemarq 15's maximum horizontal resolution is 800 dpi, and horizontal resolution is more critical than vertical resolution in determining the appearance of type.

The 300-dpi LaserJet IIISi beat several 400-dpi competitors to take third-place honors, due to very crisp output from its 300-dpi engine and because of Hewlett-Packard's RET (Resolution Enhancement Technology), which produces exceptionally attractive output for a 300-dpi printer. Our jury preferred its output to the 400-dpi output of the Dataproducts LZR 1560, the Hardware That Fits RealTech Laser, and the Mirror MirrorImage 415, particularly with solid grays. The Hewlett-Packard

LaserJet IIISi printed good grays, but the 400-dpi printers' grays showed irregularities. The QMS-PS 2000 and the Texas Instruments microLaser XL Turbo produced type of almost identical quality, but the QMS-PS 2000 performed better than the Texas Instruments microLaser XL Turbo when printing gray-scale images.

Network Needs

In a Mac-only network, a PostScript printer is rarely called on to print a file that uses a *PDL* (page-description language) other than PostScript. But in a mixed-platform network, PC users print documents based on other PDLs. The most common is HP-PCL (Hewlett-Packard's Printer Control Language), which is often used for text output on PCs. For PC graphics, HP-GL, a language used to drive many pen-based plotters, is also a common standard.

All the printers we looked at offer HP-PCL in addition to PostScript.

Both QMS printers add HP-GL to the list of supported PDLs. To make switching among PDLs easier, the Compaq Pagemarq 15, both of the QMS printers, and the Texas Instruments microLaser XL Turbo offer *automatic emulation switching*, a feature whereby the printer analyzes the incoming data, determines whether it's in PostScript or one of the other PDLs, and automatically selects the correct interpreter. Without automatic emulation switching, you must change the emulation mode either by sending commands to the printer from your Mac or PC or by manually changing settings on the printer's control panel. In mixed-platform networks, automatic emulation switching is an especially desirable feature, because if the printer is set to HP-PCL and you're trying to print a PostScript file from your Mac, the printer will simply print the raw PostScript code rather than the page that the PostScript code describes.

All but one of the printers we

tested, the Hewlett-Packard LaserJet IIISi, also feature *automatic port switching* — all the input ports (serial, LocalTalk, parallel) are active all the time. The printer accepts data received by each port on a first-come, first-served basis. The QMS printers are unique in that they can accept data simultaneously through all ports — the data is buffered in RAM, freeing up the host computer quickly.

The Hewlett-Packard LaserJet

IIISi, when configured for the Mac, comes with only a LocalTalk and a SCSI port. However, you can install the BridgePort EX, a \$995 multiport adapter card from Extended Systems, of Boise, Idaho, which includes a LocalTalk port along with RS-232 serial, Centronics parallel, and Ethernet ports — but you must switch ports manually. Automatic emulation switching isn't an option on the Hewlett-Packard LaserJet IIISi —

and when you switch from PostScript to HP-PCL, any downloaded fonts are erased from memory. PC users can change emulations by employing software commands when the printer is configured, but Mac users must use the LaserJet IIISi's control panel.

The Compaq Pagemark 15, both of the QMS printers, and the Texas Instruments microLaser XL Turbo feature automatic port switching and

On the Horizon

No matter how fast, precise, and inexpensive the current crop of printers is, one thing is certain: The next generation will be faster, more precise, and less expensive. Two new printers that are getting a lot of attention are Apple's latest LaserWriters — the Pro 600 and the Pro 630. But although they offer some of the paper-handling and multiport features typically found on workgroup printers, they continue Apple's tradition of offering slow printer engines. No LaserWriter has ever been rated at more than 8 ppm, and the two new Pros are no exception.

On the other hand, NewGen, QMS, and Kyocera are offering a brace of aggressively priced, high-performance workgroup printers. NewGen has announced two models of its Networking Series printers. One, the \$5,795 TurboPS/440N, is based on the Canon NX 17-ppm engine used in the 300-dpi Hewlett-Packard LaserJet IIISi, but with a true hardware resolution of 400 dpi, further boosted by NewGen's IET (Image Enhancement Technology) to an apparent resolution claimed to be comparable to that of 600-dpi printers. The paper capacity is 1,000 sheets, with a 2,000-sheet-feeder option and an optional envelope feeder. An exceptional feature is an Ethernet card combined with a proprietary network-protocol-sensing technology called NetWork ART (Automatic Recognition Technology); it lets Mac, UNIX, and PC networks running any mixture of EtherTalk, TCP/IP, and Novell NetWare 386 simultaneously communicate with the printer through an Ethernet interface.

NewGen's \$6,495 TurboPS/440ND has all the features of its sibling but ships with 12 megabytes of RAM instead of 8, as has the TurboPS/440N, and includes built-in duplexing. Each printer has a one-year on-site warranty in North America. NewGen Systems Corp., 17580 Newhope Street, Fountain Valley, CA 92708; 800-756-0556 or 714-641-8600.

QMS has just begun shipping its new top-of-the-line workgroup printer, the \$19,995 QMS-PS 3200, which is based on a 300-dpi Ricoh engine that prints 32 ppm in both single-sided and duplex modes, handles paper as large as tabloid-sized, and has a monthly duty cycle of a whopping 200,000 pages. The QMS-PS 3200's RISC-based controller offers Adobe PostScript, HP-PCL 4, HP-GL, and CCITT Group 4 fax emulations. It also has RS-232C serial, Centronics or Dataproducts parallel, and LocalTalk as standard interfaces; optional Ethernet and token-ring interfaces are available, as are 40-megabyte or 120-megabyte internal hard drives. Like its siblings the QMS-PS 1700 and the QMS-PS 2000, the QMS-PS 3200 is based on QMS' Crown software printer architecture, which allows automatic port and emulation switching and a user-configurable input buffer that enables the printer to accept data simultaneously on each port.

QMS has also introduced the \$5,995 QMS-PS 1725, which



The inexpensive Kyocera Ecosys aSi Printer FS-3500A produces an environmentally sound 18 ppm and has a wealth of paper-handling options.

is based on the 17-ppm Canon NX engine and driven by a 25-megahertz Intel 80960CF RISC processor, with resolution boosted to 600 dpi. The QMS-PS 1725 features PostScript Level 1, PostScript Level 2, and HP-PCL 4 emulations and includes serial, parallel, and LocalTalk interfaces plus an optional fourth interface that can be used for Ethernet or for token ring. Advanced paper-handling features include collating, offset-job stacking, and automatic jam recovery. QMS, Inc., 1 Magnum Pass, Mobile, AL 36618; 800-631-2692 or 205-633-4300.

Advanced paper-handling features — and the longest product name in the printer business — distinguish the new 18-ppm Kyocera Ecosys aSi Printer FS-3500A (\$3,895), a 300-dpi workgroup printer that enhances resolution with proprietary KIR (Kyocera Image Refinement) technology. When fully configured, the FS-3500A includes three input trays with a total capacity of 1,250 sheets, a duplexer, a power envelope feeder, and a unique 15-tray output sorter that can also function as an electronic mailbox with a 50-sheet capacity in each tray.

The FS-3500A is based on an environmentally sound — and cost-effective — amorphous-silicon (aSi) technology that eliminates the need to recycle costly OPC drums, because the aSi drum lasts for the life of the printer. Powered by a 16-megahertz Am29000 microprocessor, the FS-3500A interprets PostScript code by using an optional proprietary page-description-language clone, KPDL. Other emulations include HP-PCL 5, KC-GL (an HP-GL clone), Diablo 630, IBM ProPrinter X24E, and Epson LQ-850. Kyocera Electronics, Inc., 100 Randolph Road, Somerset, NJ 08875; 800-323-0470 or 908-560-3400.

automatic emulation switching. The Dataproducts LZR 1560, the Hardware That Fits RealTech Laser, and the Mirror MirrorImage 415 printers all have automatic port switching but not automatic emulation switching. They allow you to dedicate each port to a particular emulation, so that, for example, the printer always expects PostScript via LocalTalk and HP-PCL via the parallel port.

We tested each vendor's claim of automatic port and/or emulation switching and found that all the printers behaved as advertised. However, QMS cautions that if an HP-PCL file is closely followed by a PostScript file, either QMS printer will simply print the PostScript code rather than interpret it to produce the desired page, because HP-PCL files have no separator or end-of-file marker. QMS recommends a five-to-ten-second interval between HP-PCL and PostScript print jobs, after which an HP-PCL time-out error occurs and the printer switches to PostScript.

Only the Compaq Pagemark 15 and the QMS printers offer own-brand Ethernet options — Ethernet is becoming so prevalent that we expect to see it either as an option or as a standard feature on most future workgroup printers. In the meantime, if your printer vendor does not offer an Ethernet option, you can still connect your printer to an Ethernet network with an Ethernet-to-LocalTalk converter such as the Compatible Systems EtherWrite or the Dayna EtherPrint.

All the printers except the Texas Instruments microLaser XL Turbo have a SCSI port to which you can attach a hard drive for font storage. In the future, PostScript Level 2 printers are expected to have broader uses for hard drives — such as caching forms or patterns — but no applications currently support these features.

The Paper Chase

Paper handling is an important consideration in a workgroup printer, because having many large-capacity

Free Advice

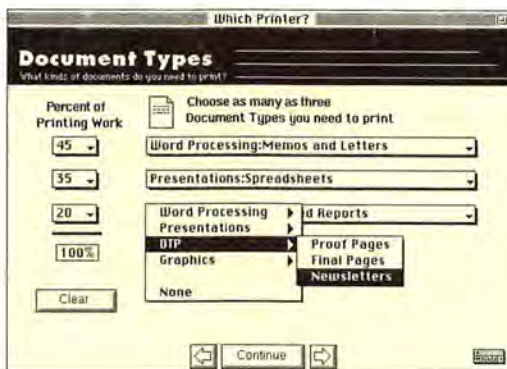
When embarking on that search for the printer that will best suit your needs, you may hire a consultant to steer you toward a smart buy. Good advice can be costly, however, so for the budget-conscious buyer, MacUser has developed a HyperCard-based expert system called Which Printer Should I Buy?

This interactive buying tool includes all the printers covered in this report along with personal printers that cost less than \$3,000. It leads you through a set of basic questions about your budget, the

types of documents you need to print, and other printer features you may need.

Which Printer Should I Buy? is available exclusively on ZiffNet/Mac, MacUser's on-line service, and is a free download until February 25, 1993. Just type GO ZMC:POWERTOOLS, and then download WCHPRT.CPT from the Download & Support Forum (GO ZMC:DOWNTECH). After February 25, it will be available in Library 3 (MacUser Utilities) of the MacUser Forum.

— Shef Syed



Which Printer Should I Buy?, a free HyperCard stack from ZiffNet/Mac, guides you to the right printer-purchase decision.

paper trays means fewer delays when one tray runs out of paper and multiple trays can simultaneously accommodate different sizes or types of paper. All the printers we tested, except the Texas Instruments microLaser XL Turbo, include software that lets you specify the paper tray to be used for a print job and even lets you print different pages within a job from different trays. The Hewlett-Packard LaserJet IIISi and the QMS-PS 2000 also let you select the *exit bin* — the place where the paper exits. During our testing, all the printers that offered these features handled them without incident.

You can also keep different sizes or types of paper loaded simultaneously so that you don't need to switch paper trays manually. Both QMS printers, along with the Compaq Pagemark 15 and the Hewlett-Packard LaserJet IIISi, automatically switch from one tray to another when the first tray runs out of paper.

All the printers we tested can handle at least 500 sheets, although the Texas Instruments microLaser XL Turbo requires an optional add-on tray in order to do so. The Compaq Pagemark 15 has a standard paper capacity of 750 sheets — a 500-sheet as well as a 250-sheet tray that can be replaced by an optional 500-sheet tray for an overall capacity of 1,000 sheets. Just as convenient are the QMS-PS 1700 and the QMS-PS 2000, whose trays can hold as many as 1,000 and 1,500 sheets, respectively. The paper-handling champ is the Hewlett-Packard LaserJet IIISi, which comes with two 500-sheet trays, one of which can be replaced by an optional 1,500-sheet tray, for a total capacity of 2,000 sheets. All the printers except the QMS-PS 2000 also offer optional envelope feeders.

Duplex printing — printing on both sides of the paper — can be a real boon, because it produces more-finished-looking output and cuts paper consumption by 50 percent. Only

the QMS-PS 1700 and the Hewlett-Packard LaserJet IIISi offer automatic, unattended duplex printing as options.

Care and Feeding

High-speed, high-volume printing means frequent trips to the toner cabinet — and perhaps frequent calls to the maintenance engineer. A laser-printer engine has three *consumables* — components that require replacement. The first is the toner. The second is the *organophotoconductor*, or OPC, often referred to as the *drum*, which receives the image from the laser beam and transfers the toner to the paper. The third is the *developer* drum, which transfers the toner from the reservoir to the OPC (see the “Inside a Workgroup Printer” sidebar). Most of the workgroup printers we tested have single-cartridge consumables that have the drum, developer, and toner in a single unit.

The Texas Instruments microLaser XL Turbo is a little more complex, with separate OPC, developer, and toner cartridges. On the plus side, its

manuals are clear and concise and the printer can print a large selection of informative diagnostic pages that detail its configuration. Also, because its consumables are separate, only depleted or worn out parts need to be replaced.

The QMS-PS 2000 is the most difficult of the printers to set up — it weighs 187 pounds and it also uses separate consumables — but QMS representatives personally install each QMS-PS 2000 sold. All the users have to do is connect the printer to the network.

Live Long and Prosper

If you plan to connect your workgroup printer to a large high-volume network, look for one with a high *duty-cycle* rating — the maximum number of pages the manufacturer recommends that you print each month. In fact, we advise you to choose a printer with a duty cycle that exceeds your current estimated usage.

Also, take into account the rated life span, in pages, of the printer's

engine. However, with printer technology evolving at a speedy clip, what's state of the art today will very likely be antiquated within two or three years. It may not make much sense to invest in a printer that will last ten years.

Bear in mind that exceeding the recommended number of pages in a given month is unlikely to result in any dire consequences: The monthly duty cycle should be regarded as the volume the printer can handle on a sustained basis. Likewise, when a printer reaches the projected limit of its engine life, it doesn't self-destruct — quite a few original LaserWriters that have printed more than a million pages are still around — but you can expect more-frequent paper jams as the mechanism wears out.

Although the Compaq Pagemarq 15, Dataproducts LZR 1560, Hardware That Fits RealTech Laser, and Mirror MirrorImage 415 printers are all based on the same engine, their vendors give different ratings for monthly duty cycles. Hardware That Fits is the most conservative, at

The Bottom Line

Life is short. The less time you waste waiting for your printer, the more time you have to improve your business's bottom line. Also, the higher the quality of your printer's output, the more professional you will look.

It's rare, however, to find a high-speed, high-capacity workgroup printer that combines both excellent image quality and high speed. Fast printers usually compromise on quality — and high-quality, high-resolution output usually means longer waits at the output tray.

Two workgroup printers we looked at for this month's report offer an unusually well-balanced combination of speed and image quality. The **Compaq Pagemarq 15** (\$3,999 list, \$3,625 street) is an impressive first foray into the printer market by Compaq, offering 800-x-400-dpi resolution on tabloid-sized pages for less than \$4,000.

For letter- and legal-sized printing, the **Hewlett-Packard LaserJet IIISi** (\$6,995 list, \$4,850 street) has a lot to offer. It's fast; it produces exceptionally good output for a 300-dpi printer, thanks to its engine and to Hewlett-Packard's RET (Resolution Enhancement Technology); and it has a wide range of paper-handling features, including optional duplexing, envelope-feeding attachments, and 2,000-sheet paper capacity.

But for those who really need a fast, heavy-duty network printer for tabloid-sized printing, the **QMS-PS 2000** (\$12,995 list) can crank out as many as 100,000 pages a month and is faster than any other printer we tested. In addition, it sports advanced paper handling, a duplexing option, and automatic

switching of ports and emulations. But remember: The QMS-PS 2000 is both a specialized tool and a fairly long-term investment — for the same price, you can get two HP LaserJet IIISi's or three Compaq Pagemarq 15s.



Top honors are shared by the impressive Compaq Pagemarq 15 (center) and the Hewlett-Packard LaserJet IIISi (right), with its RET (Resolution Enhancement Technology). If you're after speed and you're willing to pay the price, choose the 300-dpi QMS-PS 2000 (left).

20,000 pages per month. Data-products and Mirror each rate their printer at 30,000 pages per month, whereas Compaq claims 50,000 pages per month for the Pagemark 15. Fuji-Xerox, the engine's maker, no longer publishes an engine-life specification, but the fuser unit, which fuses the toner to the paper, should be replaced after about 100,000 pages.

The Texas Instruments microLaser XL Turbo is rated at 25,000 pages per month, with an unspecified engine life. The developer cartridge lasts 30,000 pages, the OPC cartridge lasts 60,000 pages, and the fuser unit should be replaced at around 200,000 pages. The Hewlett-Packard LaserJet IIISi and the QMS-PS 1700 are each rated at 50,000 pages per month. Hewlett-Packard doesn't state an engine-life rating, but the QMS-PS 1700 is rated for a whopping 1.5 million pages. The QMS-PS 2000 is the heaviest-duty printer of all those we looked at: Its monthly duty cycle is 100,000 pages, and the engine life is given as five years, which translates to 6,000,000 pages!

When Trouble Strikes

Even the hardest printer breaks down from time to time, and when it does, you want to be assured that you will get quick and accurate service. To test the quality and responsiveness of each vendor's service and support, we made a series of anonymous calls, asking two questions — one about a setup problem and the other about problems with fonts. All the vendors provided correct answers, but their response times varied considerably. The technical-support staff at Hardware That Fits, Hewlett-Packard, and Texas Instruments were able to answer our questions immediately. QMS returned our call the next day. We had to call Dataproducts back two days later. Mirror gave us the most difficulty: It had only a single printer-tech-support representative, and we twice found ourselves on hold for more

than 20 minutes on a toll call. When we did manage to get through, however, Mirror's representative was knowledgeable and helpful.

All the vendors except QMS offer a one-year warranty — in the case of Compaq and Hewlett-Packard, a one-year on-site warranty in the U.S. QMS offers a two-year warranty on the QMS-PS 1700 but only 90 days on the QMS-PS 2000. All the vendors except Hardware That Fits offer extended warranties at extra cost.

The Finest Print

If you've read this far, chances are your company has outgrown its printers and you're in the market for a printer that can keep up with the demands of a busy network and that offers high-speed printing, good-quality output, superior paper-handling features, and — for those PC holdouts — cross-platform support.

Before you buy, consider your particular needs carefully. If your workgroup frequently uses different paper sizes, you'll save time and frustration if you choose a printer with multiple trays and software paper selection. If your network contains PCs as well as Macs, automatic port-switching and emulation-switching features will likely be important. If the bulk of your work consists of simple text and spreadsheet documents, speed is your main concern and you should look at the results of our Word-document test. If, on the other hand, you produce significant amounts of graphics, give more weight to the results of our complex-PageMaker-document test. You must also ensure that the monthly duty cycle and engine-life specifications at least match your estimated needs. And, of course, there's price. For our recommendations of the best all-around workgroup-printer values, see the "Bottom Line" sidebar.

Bruce Fraser is an author, consultant, and frequent contributor to *MacUser*. **Tony A. Bojorquez**, a project leader at MacUser Labs, managed the testing for this report.

Table 1 Criteria

List price — The vendor's suggested retail price for the printer in its standard configuration.

Street price — An average price of the printer through mail order or at dealers surveyed across the U. S. in October 1992.

Engine speed — The manufacturer's rating of how many pages the printer can output after the RIP (raster-image processor) has prepared the pages for printing, in pages per minute.

Resolution — The number of dots per inch the printer can produce.

Engine life — The manufacturer's estimate of the total number of pages the printer can produce.

Monthly duty cycle — The suggested number of pages the printer can print per month.

Microprocessor, speed — The processor that powers the printer and its speed in megahertz (million of cycles per second).

PostScript version — The version of Adobe's PostScript page-description language used in the printer's RIP.

No. of ROM-resident fonts — The number of outline fonts in the printer's ROM.

Memory (standard, max.) — The minimum and maximum amounts of on-board memory the printer can accommodate, in megabytes.

Memory upgrade, price — The RAM-upgrade configurations available, in megabytes, and the price of each.

Interfaces — The standard ports available for connecting computer cables to the printer.

Page-description languages — Popular PDLs the printer supports in addition to PostScript.

Automatic emulation switching — Does the printer switch printer languages automatically?

Resolution enhancement — Does the printer use any special technology, such as smoothing jagged edges, to improve the appearance of output?

Automatic port switching — Are all interface ports active at once?

Envelope-tray option — Is an optional envelope tray available?

Paper weight (max.) — The heaviest paper stock the printer can handle, in pounds.

Toner capacity at 5% coverage — The life of the toner cartridge, in pages.

continues ►

Table 1: Features of Workgroup Printers

	Compaq Pagemark 15	Dataproducts LZR 1560	Hardware That Fits RealTech Laser	Hewlett-Packard LaserJet IIIiSi
● = yes ○ = no	■■■■½	■■■½	■■■½	■■■■
List price	\$3,999	\$3,395	\$3,195	\$6,995
Street price	\$3,625	\$3,125	\$3,195 (direct)	\$4,850
Pros	Prints tabloid-sized paper. Very good output quality. Internal fax modem. On-site warranty.	Prints tabloid-sized paper. Installation video. Good tray-switching software.	Prints tabloid-sized paper. Installation video. Good tray-switching software.	Resolution enhancement. Excellent text quality. Good paper-handling options. On-site warranty.
Cons	Complex manual.	No automatic emulation switching. Uninformative manuals.	No automatic emulation switching. Uninformative manuals.	No automatic emulation switching. Large.
Features				
Engine manufacturer	Fuji-Xerox	Fuji-Xerox	Fuji-Xerox	Canon NX
Engine speed	15 ppm	15 ppm	15 ppm	17 ppm
Resolution	300 x 300, 400 x 400, 800 x 400 dpi	300 x 300, 400 x 400 dpi	300 x 300, 400 x 400 dpi	300 x 300 dpi
Engine life	not stated	600,000 pages	600,000 pages	not stated
Monthly duty cycle	50,000 pages	30,000 pages	20,000 pages	50,000 pages
Microprocessor, speed	Am29000, 16 MHz	Weitek 8200, 7.25 MHz	Weitek 8200, 7.25 MHz	Am29000, 16 MHz
PostScript version	Level 2	Level 2	Level 2	Level 1
No. of ROM-resident fonts	43 scalable, 7 fixed	35	35	35
Memory (standard, max.)	4 MB, 18 MB	4 MB, 18 MB	4 MB, 16 MB	5 MB, 17 MB
Memory upgrade, price	4 MB, \$399; 8 MB, \$709; 16 MB, \$1,299	4 MB, \$365	4 MB, \$349	1 MB, \$169; 4 MB, \$499; 8 MB, \$898
Interfaces	parallel, RS-232, SCSI*	parallel, RS-232, LocalTalk, SCSI	parallel, RS-232, LocalTalk, SCSI	LocalTalk, SCSI†
Page-description languages	HP-PCL 5	HP-PCL 4	HP-PCL 4	HP-PCL 5
Automatic emulation switching	●	○	○	○
Resolution enhancement	●	○	○	●
Automatic port switching	●	●	●	○
Envelope-tray option	●	●	●	●
Paper weight (max.)	32 lb	32 lb	24 lb	36 lb
No. of trays/pages per tray	1/500; 1/250	1 – 3/250	1 – 3/250	2/500
Paper sizes	letter, legal, tabloid, A3 – A5, B4	letter, legal, tabloid	letter, legal, tabloid	letter, legal
Toner capacity at 5% coverage	12,000 pages	12,000 pages	12,000 pages	8,000 pages
Dimensions (L x W x H)	20.4 x 17.1 x 16 in.	20.4 x 16.4 x 15.7 in.	20.4 x 16.4 x 15.7 in.	23.6 x 21.5 x 16.5 in.
Weight	65 lb	75 lb	75 lb	123 lb
Warranty	1 year on-site	1 year	1 year	1 year on-site
Extended warranty (cost/year)	cost and length depends on dealer	1 year on-site, \$264§	none	\$564
Company	Compaq Computer Corp. P.O. Box 692000 MC120208 Houston, TX 77269 800-345-1518 713-378-8820 713-378-1442 (fax)	Dataproducts Corp. 6219 Desoto Ave. Woodland Hills, CA 91365 800-334-3174 818-887-8000 818-887-4789 (fax)	Hardware That Fits 610 S. Frazier Conroe, TX 77301 800-972-3018 409-539-3959 409-539-4141 (fax)	Hewlett Packard Co. P.O. Box 58059 MS511L-SJ Santa Clara, CA 95051 800-752-0900 208-323-2551 208-344-4809 (fax)

*LocalTalk, Ethernet, and token-ring adapters are available as options.

†RS-232, parallel, and Ethernet ports are available through a third-party multiport adapter card.

§A two-year on-site extended warranty is also available, for \$558.

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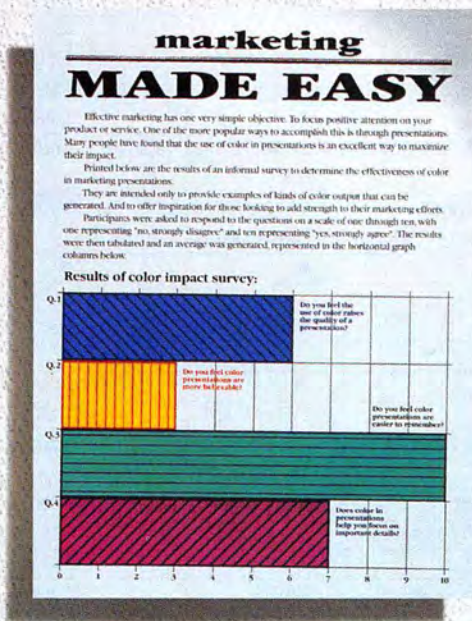
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Table 1: Features of Workgroup Printers, continued

● = yes ○ = no	Mirror MirrorImage 415 ■■■■	QMS QMS-PS 1700 ■■■	QMS QMS-PS 2000 ■■■■	Texas Instruments microLaser XL Turbo ■■■
List price	\$2,999	\$6,995	\$12,995	\$3,649
Street price	\$2,999 (direct)	not yet known	not yet known	\$3,425
Pros	Prints tabloid-sized paper. Installation video. Good tray-switching software.	Best overall image quality.	Prints tabloid-sized paper. Fastest printer tested. On-site installation. Heavy-duty.	Fast. Compact.
Cons	No automatic emulation switching. Uninformative manuals.	Slow for text. Slow on a busy network.	Expensive. Very large. Short warranty.	Mediocre output. No SCSI port.
Features				
Engine manufacturer	Fuji-Xerox	Canon NX	Ricoh M20	Sharp JX9700
Engine speed	15 ppm	17 ppm	20 ppm (16 ppm double-sided)	16 ppm
Resolution	300 x 300, 400 x 400 dpi	600 x 600 dpi	300 x 300 dpi	300 x 300 dpi
Engine life	not stated	1.5 million pages	6 million pages	not stated
Monthly duty cycle	30,000 pages	50,000 pages	100,000 pages	25,000 pages
Microprocessor, speed	Weitek 8200, 7.25 MHz	Intel 80960CAC, 25 MHz	MIPS R3000, 25 MHz	Weitek 8220, 16 MHz
PostScript version	Level 2	Level 1	Level 1	Level 2
No. of ROM-resident fonts	35	45	45	35
Memory (standard, max.)	4 MB, 18 MB	8 MB, 32 MB	8 MB, 16 MB	2.5 MB, 10 MB
Memory upgrade, price	4 MB, \$349	4 MB, \$495; 8 MB, \$799	4 MB, \$495	1 MB, \$89 (for HP-PCL); 1 MB, \$109 (for PostScript)
Interfaces	parallel, RS-232, LocalTalk, SCSI	parallel, RS-232C, LocalTalk, SCSI ^o	parallel, RS-232C, LocalTalk, SCSI ^o	parallel, RS-232C, LocalTalk
Page-description languages	HP-PCL 4	HP-PCL 4, HP-GL, CCITT Group 4	HP-PCL 4, HP-GL, CCITT Group 4	HP-PCL 4
Automatic emulation switching	○	●	●	●
Resolution enhancement	○	○	○	○
Automatic port switching	●	●	●	●
Envelope-tray option	●	●	○	●
Paper weight (max.)	32 lb	36 lb	24 lb	24 lb
No. of trays/pages per tray	1 – 3/250	2/500	2/250; 1/1,000	1/250
Paper sizes	letter, legal, tabloid, A4, A5, B4, B5	letter, legal, A4, ** executive**	letter, legal, tabloid, A3 – A5, B4, B5	letter, legal, A4, ** B5**
Toner capacity at 5% coverage	12,000 pages	8,000 pages	20,000 pages	6,000 pages
Dimensions (L x W x H)	20.4 x 16.4 x 15.7 in.	22.4 x 21.6 x 19 in.	37.4 x 25.8 x 27.5 in.	16.6 x 15.8 x 10.9 in.
Weight	75 lb	106 lb	187 lb	45.1 lb
Warranty	1 year	2 years	90 days	1 year
Extended warranty (cost/year)	\$443 – \$1,000	\$1,200 on-site	\$2,343 – \$4,602 on-site	\$588
Company				
	Mirror Technology 2644 Patton Rd. Roseville, MN 55113 612-633-2105 612-633-3136 (fax)	QMS, Inc. 1 Magnum Pass Mobile, AL 36618 800-631-2692 205-633-4300 - 205-633-0166 (fax)	QMS, Inc. 1 Magnum Pass Mobile, AL 36618 800-631-2692 205-633-4300 205-633-0166 (fax)	Texas Instruments, Inc. P.O. Box 202230 Austin, TX 78720 800-527-3500 817-771-5856 817-774-6660 (fax)

^oEthernet is available as an option.

**An optional paper tray is required for these paper sizes.

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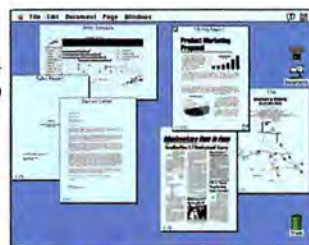
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DESKTOP PUBLISHING

King of the hill: The battle for supremacy in the high-end-page-layout wars heats up again with impending releases from the two titans, Aldus and Quark.



Nipping at their heels is Manhattan Graphics with a revamped Ready, Set, Go! ♦ **PageMaker 5.0**, due in March, comes out swinging at archrival QuarkXPress. This substantial upgrade sports a completely new print architecture that results in printing that's as much as eight times as fast. A smattering of other new features are rotation and skewing of text and graphics in .01-degree increments, drag-and-drop among multiple open documents, and nonconsecutive-page printing (you can specify pages 3, 6 to 8, and 11 to **print in one fell swoop**). An enhanced control palette includes paragraph styles and text attributes such as font, leading, and baseline shift. Although still fewer than Quark's 100 or so XTensions (sold separately), 24 Aldus Additions are bundled with the product, including 2 for sophisticated range kerning and font-track editing. PANOSE font mapping lets you designate which fonts you'd like substituted for missing fonts in a PageMaker document. 206-622-5500. \$795.

♦ **QuarkXPress 3.2** doesn't offer the dramatic improvements found in PageMaker 5.0, but it does include several refinements. It currently supports Font Creator, for generating Adobe's multiple master typefaces, and more significantly, it includes an XTension for Electronics for Imaging's EfiColor,




which facilitates consistent color output. Users can take advantage of EFI's gamut mapping and color-metric tags to ensure that what's created on-screen will actually print. Other new features include style-sheet linking, window tiling, text- and picture-box skewing, and vertical character scaling.

Two nifty ideas: Save for Service Bureau automatically saves the file, linked graphics, and other layout data in a folder ready for a service bureau, and user-definable Auto-backup saves a file without deleting earlier versions. 303-894-8888. \$895.

♦ The dark horse in this contest may well be **Ready, Set, Go! 6.0**. Newly revised and repackaged by developer Manhattan Graphics after languishing under former distributor Letraset, RSG! 6.0 adds **a bevy of features** that make it a strong challenger. Features such as automatic drop caps, gradient fills and color blends, floating palettes, and multiple master pages bring it in line with high-end programs at a low-end price (\$395). RSG! 5.0 incorporated the late Design-Studio's color-separation Annex; version 6.0 takes

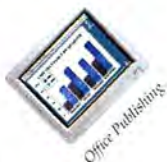


RSG!'s fine color capabilities one step further by adding support for CMYK TIFFs, the trapping of RSG-generated objects, and the specification of tints in 1-percent increments. This now-System-7-savvy software also supports QuickTime and publish-and-subscribe of RSG!-formatted text (subscribers can edit or change styles to published text without worrying about layout details).

Upgrades from every flavor of RSG! and Design-Studio will be available, although pricing hadn't been set at press time. 914-725-2450. 

By Pamela Pfiffner

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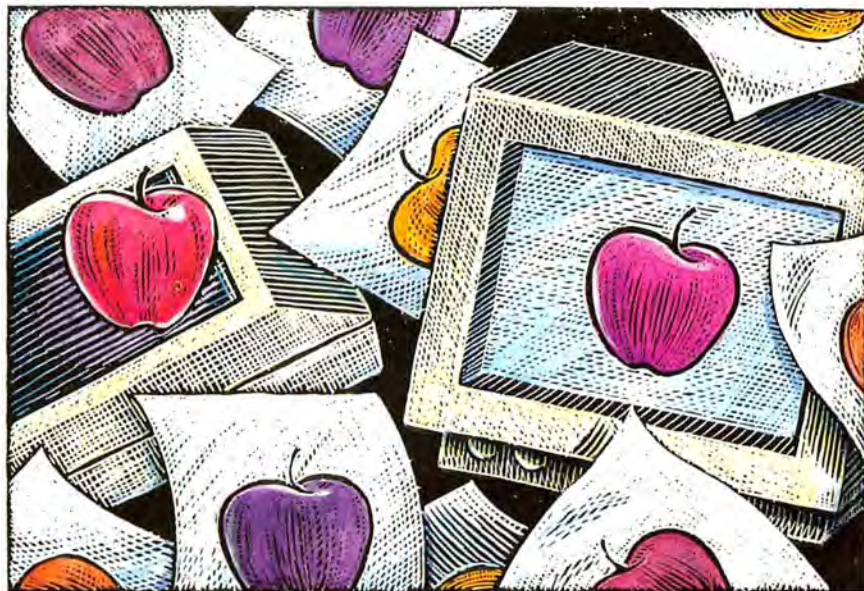


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Getting Color in Sync



Maintaining consistent color from scanner through monitor to printer has been the final frontier in desktop publishing. Here's how ColorSync, Apple's color-management system, promises to blaze a new trail.

By Bruce Fraser

In 1993, the long-promised Year of Color may at last be upon us. Apple has finally moved into the color-peripherals market, with the Apple Color Printer and the Color OneScanner (for more on Apple's color peripherals, see New on the Menu in this issue). Third-party color printers have never been cheaper or more plentiful, with thermal-wax printers available for less than \$5,000 and prices for dye-sublimation printers hovering around the \$10,000 mark.

The cost of color printers is only one of the factors that has inhibited the more widespread use of color until now. Working in color is inherently much more complicated than working in black-and-white, and all too often color is unpredictable. The color that looked so vibrant on-screen comes off the printer looking flat, skies that look blue on your monitor turn purple on a coworker's machine, and the same file gives three completely different sets of results when printed on three different color printers. The reason Apple waited so long before producing color peripherals is that it wanted to provide a solution to the problem of unpredictable color. Apple's ColorSync extension for System 7 is that solution.

ColorSync is a color-management system that currently ships with the Apple Color Printer and Color OneScanner and will be supported later by third-party applications and peripherals. It provides a way of matching colors among disparate devices such as scanners, monitors, and printers so that your color remains predictable. Color-management systems aren't

completely new to the Mac: Cachet, from EFI (Electronics for Imaging), and Kodak's PCS 100 Quadra 950-based workstation system use the proprietary color-management systems EfiColor and KCMS, respectively, but these color-management systems work only with specific Mac applications (for more on Cachet, see the review in this issue). ColorSync, in contrast, is Mac system software that is available for any application to use.

ColorSync is more than just an Apple-label color-management system, however. It's also a system-level architecture that lets other color-management systems coexist transparently in the system (see Figure 1). This means that application developers won't have to concern themselves with the details of color matching across devices — they can simply ask the Mac operating system to do it for them. It also means that users and developers alike won't be locked into Apple's own color-management system. Color-management software developers can access ColorSync through the Component Manager. Those who need either greater speed or more accuracy than what Apple's own color-matching methods offer will be able to plug third-party color-management technologies such as EfiColor or KCMS in to their Mac systems. Thanks to the ColorSync architecture, applications won't need to worry about which color-management system is actually being used. If an application supports ColorSync, it will support all the other color-management systems too.

Eye of the Beholder

To understand the differences among rival color-management technologies — their benefits and their limitations — we need to look at the phenomenon of color and at the way color is represented on computers. Understanding these concepts is critical to appreciating what Apple has achieved in creating ColorSync.

Color is difficult to quantify. It is in the eye of the beholder — something that happens in the human brain, not in the external world. We can measure wavelengths of light, but this doesn't help much. Yellow light, for example, has a wavelength of 550 nanometers, but you also get the sensation of yellow when green and red light are combined. Different wavelength combinations that produce the same color are called metamers of one another.

Ambient light also affects our perception of color. The combination of wavelengths in natural light varies with the weather and the time of day. The color you perceive when you view an object is caused by some wavelengths of light being absorbed by the object and other wavelengths being reflected, so variations in ambient light can make the same object appear to be differently colored at different times. If you're serious about color matching, one thing you need to do is to standardize your lighting where you make crucial judgments about color.

But computers don't deal with wavelengths of light or, for that matter, with color itself. All that computers know how to handle is numerical values that, when sent to a particular device, cause it to produce something our eyes and our brain perceive as color. When we say that 24-

bit images can contain 16.7 million colors, we're being slightly inaccurate. What they contain isn't color; rather, it's a list of ingredients for making color.

Parallel Universes

In the Macintosh universe, two main models, or *color spaces* — RGB (red, green, blue) and CMYK (cyan, magenta, yellow, black) — are used to convey color information. Both models work by combining different amounts of *primary* colors to produce all the colors in the color space. Red, green, and blue are the *additive* primary colors, and they give the RGB color space its name. Cyan, magenta, and yellow are the *subtractive* primary colors, sometimes also known as the *secondary* colors (see Figure 2). Both color spaces simply list the quantities of primary colors that make up a

Figure 1: Apple's United Nations of Color

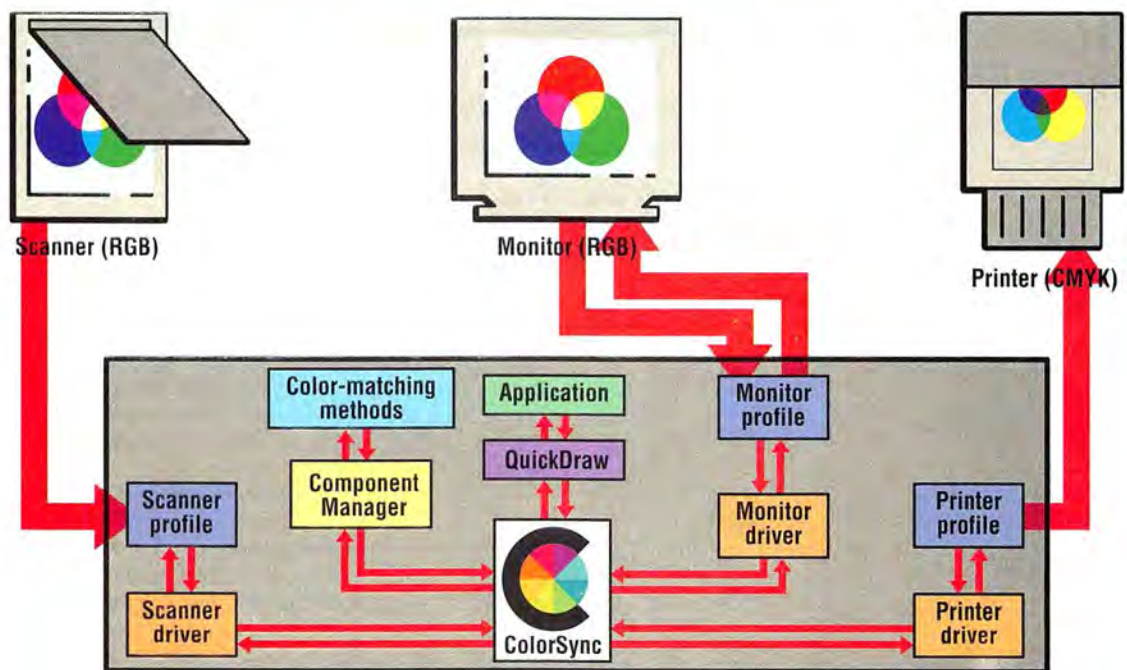


Figure 1: Apple's ColorSync system extension acts as a United Nations of color, performing simultaneous translation between different devices' RGB or CMYK color spaces. Using vendor-supplied software profiles, ColorSync translates between RGB or CMYK data generated by a specific device and a neutral, or device-independent, color space that represents color as humans see it. The RGB values ColorSync sends to the monitor may be different from those received from a scanner, but the color we see on the monitor is the same. Because ColorSync operates on the system level, ColorSync-savvy applications simply ask the system to take care of color matching, and the system then calls upon ColorSync to take care of the details. ColorSync's color matching is handled through the Component Manager, so other color-management systems, such as EFI's EfiColor and Kodak's KCMS, can be used instead of ColorSync for color matching.

given color, and the computer must be able to translate between them.

The RGB color space, which is used by monitors and most desktop scanners, is called an additive color space, because it works by starting with no light (black) and then adding quantities of red, green, and blue light to obtain colors. In this color space, white is produced by the addition of maximum amounts of red, green, and blue. Scanners read the amounts of red, green, and blue light that are reflected from an image and then convert those amounts to digital values. Monitors receive the digital values and convert them into the red, green, and blue light we see when we look at their screens.

Printing, which uses the subtractive color space, is a whole different story. In print, you start with white paper, which reflects all wavelengths of light equally, and you apply pigments to the paper. The pigments absorb, or subtract, specific wavelengths of light and thereby produce the sensation of color. In theory, adding 100 percent each of cyan, magenta, and yellow ink to white paper should produce black, but because inks are not pure, it usually produces a muddy brown. Therefore, black is added as a fourth color, both to obtain true black and to cut down on the amount of ink needed to reproduce dark color. Most printed color uses the CMYK color space, in which CMYK values dictate how much cyan, magenta, yellow, and black ink is laid down at each point on the page.

Between RGB and CMYK

The trouble with the RGB and CMYK color spaces is that they're ambiguous: Different devices produce different colors from the same RGB or CMYK values. Scanners use a light source to illuminate the image and color filters to split the light into red, green, and blue components. Vendors use different lamps and color filters in their products, so two different scanners may "see" the same color differently and assign it different values of red, green, and blue. Because scanner lamps and color filters change with age, the same scanner may also assign different values to the same color over time.

Monitors convert RGB values to light by sending streams of electrons that excite red, green, and blue phosphors, causing them to emit light. Different monitors have different phosphors, and the

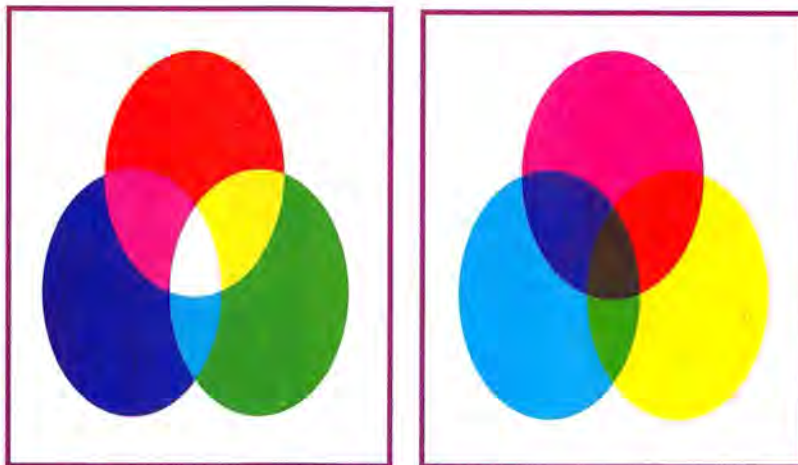


Figure 2: A key hurdle faced by ColorSync and other color-management systems is that devices use different color spaces. Scanners, monitors, and other devices that mix light to create color use additive color, in which combining red, green, and blue equally results in white (left). Printed materials reflect some colors and absorb or subtract others, so printers use subtractive color, in which combining cyan, magenta, and yellow inks equally should yield black (right). But because inks are impure, black is added as a fourth color.

phosphors themselves change with time and temperature, so the same RGB value can produce various colors on various monitors or on the same monitor over the course of time.

The CMYK color space suffers from similar shortcomings. Variations occur in the purity of inks and in the color and absorbency of the paper on which they are printed. Because the colors produced by RGB and CMYK specifications vary from device to device, they're called *device-dependent* color spaces. To make consistent color a reality, we need a *device-independent* color space.

Inconsistencies within the RGB and CMYK color spaces are bad enough, but when you try to convert one color space to another, the problems get worse. In the typical production process, an image is captured by a scanner, sent to a computer, displayed on a monitor — possibly altered in some way — and then printed on a printer. Scanners and monitors use RGB, but printers use CMYK, so the color information must be converted from one color space to the other. Converting RGB to CMY would be easy, because RGB and CMY are the inverse of one another, but when black enters the equation, things get a lot more complex.

When you add black, it replaces a percentage of the other three colors and you generally want to remove a proportional amount of cyan, magenta, and yellow. The question then becomes how

much black to add and how much cyan, magenta, and yellow to remove. No single magic formula is right for all situations. The type of printer or printing press, the paper stock, and the inks used all influence the balance between cyan, magenta, yellow, and black. The printing industry uses ink standards such as SWOP (Specifications Web Offset Publications) and SNAP (Specifications for Nonheat Advertising Printing) to make the process a little more controllable, but black generation accounts for much of the art and science of making good four-color separations. It also makes it difficult for nonexperts to predict what color they'll end up with when they convert their RGB color files to CMYK ink on paper. This is also the challenge ColorSync and other color-management systems face.

Running the Color Gamut

One more obstacle we have to face on the road to consistent color is that each different device has a different *color gamut* — the total range of color it can produce (see Figure 3). Color monitors have a much wider gamut than do color printers or printing presses, so it's easy to create art that's stunning on the computer monitor but disappointing in print. Bright, saturated colors that look great on-screen can become flat and washed-out in print.

This is a problem anytime you try to match printed output to what you see on



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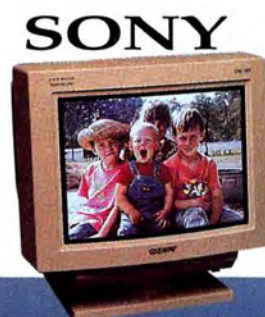
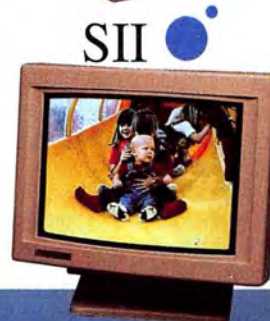
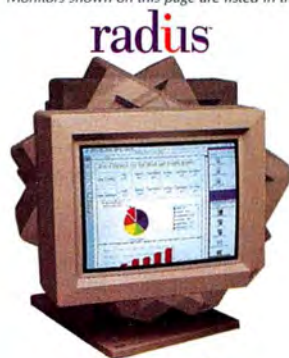


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PaintBoard Li	829	24 1024 x 768	4	■	
24STV	799	24 640 x 480	1	■	Up to 30
MediaTime	1,599	24 640 x 480	1		Up to 30
SUPERMAC					
Spectrum/24 PDQ Plus	\$1,549	24 1152 x 870	4	■	
Spectrum/8	419	8 1152 x 870	4		
Spectrum/24 Series III	829	24 1024 x 768	3	■	
Spectrum/8•24 PDQ	829	24 640 x 480	4		
Spectrum/8•24	579	24 640 x 480	4		
Video Spigot	369	24 160 x 120	1		Up to 30
Video Spigot & Sound	749	24 160 x 120	1		Up to 30
RADIUS					
Precision Color 24X	\$1,649	24 1152 x 882	4	■	
Precision Color 8XJ	499	8 1152 x 882	4	■	
Precision Color 8X	749	8 1152 x 882	4	■	
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Precision Color 24XP	499	24 832 x 624	2	■	
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Monitors shown on this page are listed in the chart at right.



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B. RasterOps 21" Color	2,799	Hitachi				■		■		
C. SuperMac (SuperMatch) 21"	2,529	Hitachi				■		■		
SuperMac 21" Mono/Grayscale	989	—				■		■		
D. RasterOps 20" Trinitron Multi-Mode	\$2,329	Trinitron	■		■	■	■	■		
Radius Precision Color 20"	2,389	Trinitron	■		■	■	■	■		
RasterOps 20" Hitachi Color	1,469	Hitachi	■		■	■	■	■		
E. RealTech 20" Trinitron Multi-Mode	1,895	Trinitron	■		■	■	■	■		■
F. SuperMac 20" (SuperMatch)	1,499	Hitachi			■			■		
G. SuperMac 20" (SuperMatch Dual-Mode)	2,499	Trinitron			■	■		■		
H. NEC 17" 5FG Color	\$1,589	Toshiba	■		■	■	■	■	■	
I. RasterOps 16" (RasterOps Sweet 16)	1,249	Panasonic		■					■	
J. RealTech 17" (RealTech Multi-Mode)	995	Hitachi	■		■	■	■	■		■
K. Sony 17"	1,189	Trinitron	■		■	■	■	■		■
L. Seiko 17" (1760)	1,149	Trinitron	■		■			■		
Radius 15" Precision Color Pivot (at left)	\$959	Non-Trinitron	■	■	■	■		■	■	■
RealTech 15" Grayscale (shown at left)	449	—		■				■		■
Seiko 14" Color 1445 (shown at left)	479	Trinitron	■					■		■
Sony 13" Color (shown at left)	689	Trinitron	■					■		■

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Scanmaker IIIXE <i>Includes ScanMatch color calibration software</i>	1,179	600	14	8.5 x 11	■			<i>Includes full version of Adobe Photoshop</i>
Scanmaker 1850 Slide Scanner	1,569	1850	14	2.5 square inches			■	<i>Includes full version of Adobe Photoshop</i>
REALTECH								
Scan 800 <i>Optional Adobe Photoshop</i>	\$1,199 200	800	200	8.5 x 11.75	■			<i>Includes ScanMatch color calibration software</i>
Scan 800 with Transparency Option	1,695	800	200	8.5 x 11.75	■	■	■	
UMAX								
UC 630	\$1,179	600	51	8.5 x 14	■			<i>Includes full version of Adobe Photoshop</i>
Transparency Option	729	(600)	(51)	6 x 9	■	■	■	
UC 840	1,289	800	51	8.5 x 14	■			<i>Includes full version of Adobe Photoshop</i>
Transparency Option	729	(800)	(51)	6 x 9	■	■	■	
UC 1200S	3,179	1200	51	8 x 11.8	■			<i>Includes full version of Adobe Photoshop</i>
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- No SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 35 Micro-fine toner and NEC's patented "Sharp Edge" technology create sharp black print quality

NEC



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- 400 dpi
- 4 pages/min.
- 4 Mb RAM (expandable to 16 Mb)

- PostScript compatible
- Weitek XL-8220 processor

- 3,500 pages per month
- Optional 2nd paper drawer

- Optional SCSI port
- Appletalk RS-422, parallel, RS-232C

- 35

NewGen 400P

\$1,879

Lease: \$51/month

Real Tech

- 300 dpi
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- 2 Mb RAM (expandable to 10 Mb)

- Adobe PostScript Level 2
- Weitek RISC processor

- 5,000 pages per month
- Optional 2nd paper tray & cassette feeder are available for \$250 (for both)

- SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 35 ATM font rendering technology builds raw type characters 4 to 5 times faster, enabling the RealTech Laser to print complex documents faster than other printers in its price range.

RealTech Laser

\$1,595

Lease: \$44/month

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★★★★1/2

"The RealTech features not just a genuine Adobe interpreter, but also a PostScript Level 2 raster image processor (RIP), which earns it more than a few points for forward compatibility."

— PUBLISH MAGAZINE, Feb. 1992

Texas Instruments MicroLaser XL Turbo

\$2,795

Lease: \$77/month

- 300 dpi
- 16 pages/min.
- 2.5 Mb RAM (expandable to 10.5 Mb)

- Adobe PostScript Level 2
- Weitek RISC processor

- 25,000 pages per month
- Optional 2nd paper drawer

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- Appletalk RS-422, parallel, and RS-232C

- 35

TEXAS INSTRUMENTS



Texas Instruments MicroLaser Plus

\$1,249

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- Optional SCSI port
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- 17 Available with 35 resident fonts (\$1349)

The only 11x17 printer with Adobe PostScript Level 2 for less than \$3500.



- Choice of 300 or 400 dpi
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- Adobe PostScript Level 2
- Weitek RISC processor (and ATM font rendering technology)

- 30,000 pages per month
- Two paper trays included (one tray for letter size; one tray for tabloid size.)

- SCSI port
- Three interface ports: Appletalk RS-422, IBM PC parallel, and RS-232C.

- 35

★★★★★ MACWORLD MAGAZINE September 1992

"...be forewarned: PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."

Quote from MacUser September 1992 issue, "Personal PostScript Printers" by Bruce Fraser.

\$3,195

Lease: \$88/mo.

RealTech Laser 400

QMS 860 Hammerhead

\$4,279

Lease: \$117/mo.

- 600 dpi
- 8 ppm (letter size); 4.6 ppm (tabloid size)
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- Adobe PostScript compatible
- Intel 80960CA RISC processor

- 10,000 pages per month
- Optional 2nd paper cassette

- SCSI port
- Optional Ethernet
- 39 fonts

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Jeanne is thrilled that she can print proofs of her company newsletter on tabloid-size paper. No more tiling!



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CIRCLE 199 ON READER SERVICE CARD.

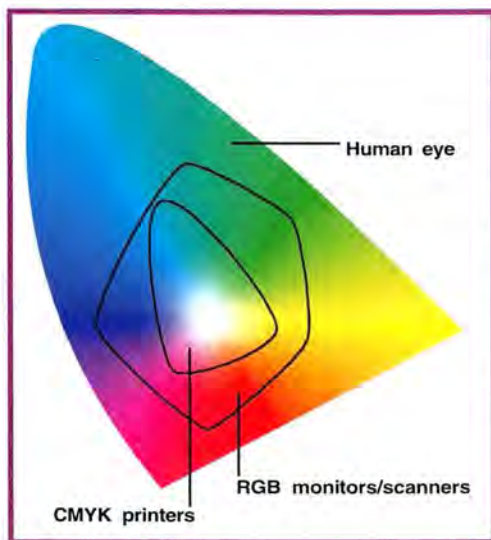


Figure 3: A critical problem for color-management systems is matching the color gamut, or color range, of devices. The human eye sees a wider range of colors than computer devices can reproduce, and scanners and monitors handle a wider range of colors than does print. ColorSync offers several methods of compressing the larger monitor or scanner gamut into the narrower printer gamut while maintaining as close a color match as possible.

a monitor, but it's a particular problem with computer-generated photo-realistic art created with rendering applications. With scanned images, you at least have the original photograph for reference, and with graphics created in Adobe Illustrator or Aldus FreeHand, for example, you can use ink-swatch systems such as Pantone, TruMatch, or Focoltone to get an idea of how your colors will look in print. Rendered art such as that created by Pixar RenderMan, for example, has no similar real-world source, however.

Different printing processes also have different color gamuts. A phase-change or dye-sublimation printer has a wider gamut than any printing press, and coated paper has a wider gamut than has newsprint, for instance.

Consistent-Color Components

So we have a formidable list of reasons why color obtained from a scanner, color displayed on a monitor, and the color produced in final output don't match. Different devices interpret RGB or CMYK values differently, conversion from RGB to CMYK is difficult, and many colors that appear on a monitor can't be reproduced in print. ColorSync promises to solve all these problems, making color consistent and predictable through the entire production chain, from scanner to monitor to print.

The idea behind all the forthcoming color-management systems, including ColorSync, is straightforward and relies on three components: an underlying *device-independent color model*; a set of *device profiles* that allow the system to

convert device-dependent color specifications for different devices to and from the underlying device-independent color model; and a *color-matching method*, which provides a good approximation in those cases where the requested color lies outside the target device's gamut.

We can't escape RGB and CMYK, but what we can do is compare them with a standard that represents color as we experience it. Instead of using ambiguous color spaces such as RGB and CMYK to pass color data through a system, ColorSync uses a nonambiguous color space as a reference. Each device — be it a scanner, monitor, or printer — has an associated device profile that contains instructions for translating data between the reference color space and the device's own RGB or CMYK color space. Although the RGB or CMYK values differ from device to device, the color we perceive remains consistent across different devices, within the limitations of their color gamuts. Let's look at each of these components in turn.

Device-independent color model.

The cornerstone of ColorSync, EfiColor, and Kodak's KCMS and forthcoming end-user product ColorSense is a set of color spaces developed in the '30s by the CIE (Commission Internationale de l'Eclairage), the international standards group for color and illumination. The CIE models were the first to specify color in terms of human perception rather than just listing the ingredients needed to make a particular device produce a given color. The reason CIE-based color has taken so long to appear on the desktop is that

heavy computation is needed for translating between the CIE color spaces and the device-dependent RGB and CMYK spaces. Until recently, desktop computers didn't have the horsepower to do that computation.

The CIE color system standardizes the three basic components that make up color as it's experienced by the human nervous system: the light source, the object, and the observer. In 1931 the CIE collected data about the color perception of several observers with normal color vision and then used that data to define an imaginary standard observer. Likewise, it defined several standard light sources. It then developed algorithms to derive three imaginary primary constituents of color — X, Y, and Z — that can be combined at different levels to produce all the colors the human eye can perceive. The color of an object can then be defined in terms of X, Y, and Z for a specific light source and observer. The resulting color model, CIEXYZ, has spawned a series of other CIE color models, all of which are mathematically related. These color models form the basis for the current crop of color-management systems, serving as a kind of Rosetta stone that lets us translate color among different devices' color spaces.

Device profile. The second piece of the color-management solution is the device profile. A device profile contains data about a given device's color capabilities, providing a way to translate CIE color values into the specific RGB or CMYK values the device needs to reproduce a given color, and vice versa.

The process of making a device profile is known as *characterizing* the device. Characterizing a device for use with ColorSync is relatively simple, and so are the resulting device profiles. The profiles contain measurements of a device's white point and black point and the device's limits at saturated red, green, blue, cyan, magenta, and yellow. These measurements represent the limits of the device's color gamut. ColorSync uses algorithms to interpolate all the values that fall within these limits. EfiColor and KCMS use much more complex profiles that contain measurements of approximately 600 points in the color space. These measurements are stored in a lookup table, and intermediate values are calculated algorithmically.

The benefit of ColorSync's approach is that it requires relatively little memory,

EfiColor's and KCMS' approaches are more memory-hungry, but they are also much more accurate. Apple also provides tools that let third-party-peripheral vendors characterize their own devices; both Kodak and EFI do the device characterizations themselves, so ColorSync will likely support more devices than will its rival systems, at least initially.

Color-matching method. The combination of the CIE model and device profiles makes it simple to translate a color in one device's color space to another device's color space, as long as both devices can reproduce that color. But as we've seen, different devices have different color gamuts. This means that one device is able to reproduce colors that another device cannot. In cases where an exact match isn't possible, a color-management system needs to provide the best possible alternative. Schemes for determining the best color approximation are called color-matching methods (CMMs), and these constitute the third and final component of color-management systems.

ColorSync's CMM offers four options for matching color — Perceptual, Colorimetric, Saturation, and Faster — each suited to a particular kind of artwork. It is up to each application developer to decide what kind of interface to provide, and some applications may not make available all the color-matching methods ColorSync offers.

Perceptual matching maintains the perceptual differences among the colors in an image: This usually means compressing a wide source gamut into a narrower target gamut. All the colors in the image may undergo some kind of distortion, but their relationships to each other are maintained. Perceptual color matching is usually the best option for scanned images.

Colorimetric matching leaves colors unchanged when they fall within both the source and the target gamuts. Colors that fall outside the target gamut are compressed to bring them within the gamut. This approach is usually best for spot colors, but it occasionally also proves to be useful with scanned images that

contain "memory" colors, which conjure up specific color images, such as the red of a tomato.

Saturation matching maintains the relative levels of color saturation at the expense of contrast. This is usually the best option for computer-generated photo-realistic art.

These are the three basic approaches to color matching. ColorSync adds a fourth option, called Faster, which, according to Apple, offers a good compromise between Perceptual and Saturation matching for photographs and rendered images and is quicker too.

Calibration's Role

Where does calibration fit into all this? Calibration isn't absolutely necessary for making use of color management, but it can improve your results. A device profile provides color specifications for a monitor, a printer, or a scanner; calibration ensures that the device is actually performing according to those specifications. This is particularly important in the case of monitors and scanners, which

Ofoto 2.0 Closes the Color Loop

Apple's ColorSync, EFI's EfiColor, and Kodak's KCMS and ColorSense are all fundamentally similar in that they translate color in and out of a CIE-based color space by means of device profiles. Light Source's Ofoto Color, the color-management utility bundled with the Ofoto 2.0 scanner software, takes a different approach. Instead of relying on vendor-supplied profiles, Ofoto uses a process known as closed-loop calibration. Here's how it works:

A printed color target is included in the package. You scan the target on your scanner, print the resulting scan on your printer, and then scan the print. Ofoto Color compares the result with the values it "knows" are in the color target and examines the differences. It not only calculates the offset between the original color and the reproduced color but it also looks at the trends of the color shifts so that it can predict the color shifts of other images. Ofoto Color then creates a profile for the entire chain, from scanner to printer (see figure at right).

Light Source claims that its color-management method is more accurate than any of the CIE-based approaches. Ofoto Color also has the advantage of working with any scanner/printer combination, freeing users from relying on vendor-created device profiles. Because calibration and characterization are part of the same process, you can update the profile anytime to ensure that the current state of your production chain is accurately reflected in the device profile.

Ofoto Color includes color-correction information in a table in the image file. When Ofoto Color is used with ColorSync-compliant applications such as Ofoto 2.0 itself, the color correction is read and applied at print time by means of the printer driver. With applications that attempt some kind of color correction themselves, such as Adobe Photoshop and Aldus PageMaker, you must apply the color correction to the image before opening it in the application. The disadvantage is that

the image data is permanently changed and the resulting image may look peculiar on-screen. However, it will print correctly. Once these applications have been revised to take advantage of ColorSync, the image will display correctly on-screen as well as in print.



Ofoto 2.0 offers closed-loop calibration, which adjusts your scanner and printer to a color that has known values. You print the color target from Ofoto Color and scan the print back in. Ofoto Color compares the scanned results with an internal database that represents the scanner's characterization; it then calculates the differences between the results and the database and creates a profile for your production chain.

can vary significantly over the course of time. The easiest way to bring calibration into play for more-accurate color is to let the calibration hardware update the device profile of the monitor, scanner, or printer being calibrated.

At press time, only two vendors had announced calibration products that will work directly with a color-management system to update device profiles. Kodak's ColorSense package (\$499) includes the ColorSense color-management system,

a hardware monitor-calibration device that updates ColorSense monitor profiles, and a scanner target that lets users update their ColorSense scanner profiles. Sequel Imaging's MonCal and SysCal software and the company's System Calibrator hardware let users create ColorSync profiles for monitors and printers. Other calibration-system vendors will certainly follow suit.

In Sync with Color

It will be some time before ColorSync is completely implemented. The ColorSync extension itself is fully functional, but device profiles for color peripherals and drivers that can make use of these profiles are required before ColorSync actually does anything other than occupy 70K in your System Folder.

The first wave of color-managed products will be in the form of device drivers; scanner drivers and printer drivers that can understand ColorSync profiles will provide color matching between input and output. The Apple Color OneScanner and Apple Color Printer drivers are ColorSync-aware, and both devices ship with ColorSync device profiles. Third-party vendors will almost certainly follow suit, offering printer drivers with ColorSync profiles: GCC, one of the first, includes ColorSync profiles with its ColorTone dye-sublimation printer and ColorFast film recorder. The long-awaited PostScript Level 2 printer driver will also understand device profiles, bringing color-matching capabilities to PostScript output devices.

But applications will have to be revised to support color matching on monitors, because drawing to a monitor is under direct application control. So far, only Light Source's Ofoto 2.0, the color version of Light Source's scanner software, included with the Apple Color OneScanner and sold separately for \$395, offers monitor color matching directly (see the "Ofoto 2.0 Closes the Color Loop" sidebar). But ColorSync will be included in Apple's forthcoming QuickDraw GX imaging model, so any effort invested in ColorSync-compatible-application development will be preserved under QuickDraw GX. The real question is not so much whether applications will be rewritten to support ColorSync, but when.

ColorSync also allows applications to provide features such as gamut simulation, which allows a monitor to display

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accurately the narrower color gamut of the target output device, and gamut alarms, which alert you that certain colors fall outside the target device's gamut. This makes it possible for you to use monitors or color printers as color-proofing devices, thus reducing the reliance on expensive film-based proofing mechanisms such as 3M's MatchPrint or Du Pont's Cromalin. Even the best gamut simulation on a Macintosh won't replace MatchPrints and Cromalins completely — only film-based proofing lets you proof the film itself, checking for moiré

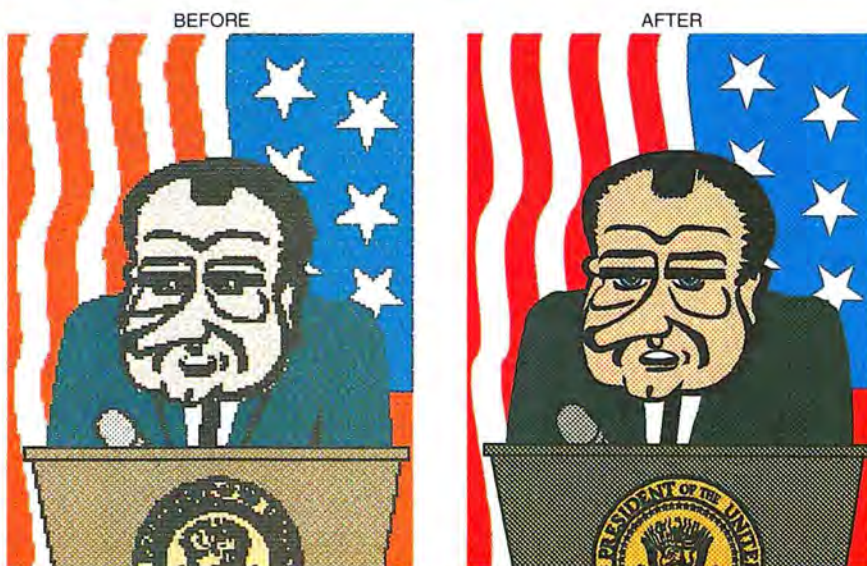
The real question is not so much whether applications will be rewritten to support ColorSync, but when.

patterns and correct trapping — but good gamut simulations allow you to run only one set of MatchPrints instead of three or four, with attendant savings of time and money.

Kodak's ColorSense package includes a stand-alone application, Manager, that opens color images, corrects the color for the particular monitor being used, and provides on-screen gamut simulation for the target printer. It also prints color-corrected images to supported printers. The package includes an extension, ColorSense Extend, which provides gamut simulation in any application. However, ColorSense Extend manages color correction only on output that has been created with QuickDraw-based applications.

ColorSync does not in and of itself make color consistent and predictable, but it lays the groundwork for "push button" color. The various color-management systems will all have different strengths and weaknesses, and in the early days at least, the choice of a color-management system may be dictated by the availability of device profiles for your input and output devices. But because applications are insulated from the details of the various color-management systems, it seems overwhelmingly likely that color management on the Macintosh will quickly become a reality. 

Contributing editor Bruce Fraser occasionally uses colorful language.



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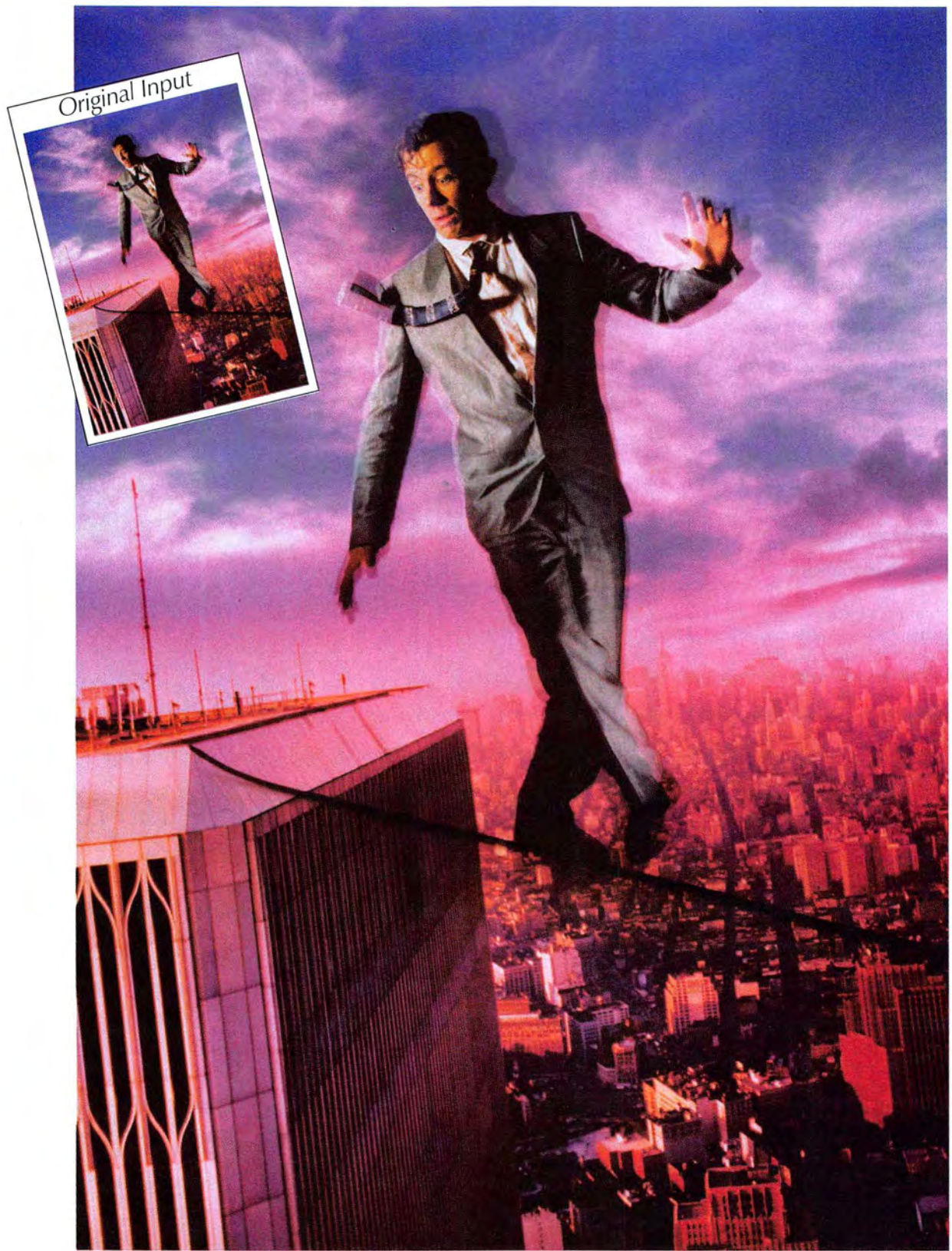
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Lotus 1-2-3 Video #3	<input type="checkbox"/>
Macintosh (6.0 or 7.0) Video #1	<input type="checkbox"/>
Macintosh (6.0 or 7.0) Video #2	<input type="checkbox"/>
Macintosh (6.0 or 7.0) Video #3	<input type="checkbox"/>
Microsoft Excel Video #1	<input type="checkbox"/>
Microsoft Excel Video #2	<input type="checkbox"/>
Microsoft Excel Video #3	<input type="checkbox"/>
Microsoft Excel Video #4	<input type="checkbox"/>
Microsoft Excel Video #5	<input type="checkbox"/>
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This Month on ZiffNet/Mac

ZMAC UTILITY

If your eyes glaze over at the sight of all the charts and numbers in this month's printer lab report, take a look at *Which PostScript Printer Should I Buy?*, a HyperCard-based analysis tool compiled from the results of the printer lab report printed in this issue. This interactive buying guide asks a few basic questions: What types of documents do you print? What's your budget? What size paper do you use? The stack then gives you the names of printers that might meet your needs. *Which PostScript Printer Should I Buy?* covers both the workgroup printers tested for this issue and the low-cost personal printers reviewed in the September '92 issue ("PostScript Printing That Won't Break the Bank," page 160).

Which PostScript Printer Should I Buy? is based on a design by HyperCard-programming expert Danny Goodman. It is available exclusively on ZiffNet/Mac and, under the membership fee, is available free for one month. Until February 25, 1993, just type GO ZMC:POWERTOOLS. After that, you can find the file WCHPRT.CPT in Library 7 of the Download & Support Forum (GO ZMC:DOWNTech).

By Ben Templin

Image Assistant

Image Assistant, the new image-editing tool from Caere, is the focus of a week-long conference in ZiffNet/Mac's Executives Online Forum (GO ZMC:EXEC) from February 22 to 26. Caere product manager Dan Real will be available to answer your questions about the product. Image Assistant has been praised for its intuitive interface and ease of use, although some reviewers have found it a little slow. See for yourself by downloading a disabled demo from the Download & Support Forum (IMGDEM.CPT, Library 13). There's also a QuickTime video that shows Image Assistant's features (SVIMAG.SEA, Library 7).

Free (and Nearly Free) Files

Sysop Gregory Wasson presents a sampling of files recently uploaded to ZiffNet/Mac's Download & Support Forum (just type GO ZMC:DOWNTech). The filename and library name are in parentheses.

ComIT (COMIT.SEA, Library 1), short for Communication Integration Tool, lets you monitor communication costs for on-line connect time and voice phone calls. You can even use ComIT to dial your phone. Shareware, \$20. 146K.

PhoneBook Plus (PHONPL.SEA, Library 1) is a multifeatured personal information manager with many niceties for handling long lists of names and addresses. It has envelope printing, a robust phone-call timer, and extensive phone-dialing features. Also available as a DA for System 6 users. Shareware, \$25. 96K.

Powerless (POLESS.CPT, Library 1) lets you schedule automatic, unattended system shutdowns. This lets you leave your computer


running to complete a lengthy, boring task (such as a backup or a disk optimization) and then shut it off later when the task is done. Requires System 7.0 or later. Shareware, \$19.95. 14K.

Quotable Quotes (QUOTAB.SEA, Library 6) is a HyperCard stack that contains nearly 1,200 quotes on a variety of common subjects. It's indexed by theme and author. As Montaigne said, "I quote others only to better express my own self." Shareware, \$10. 285K.

Susan (SUSAN.CPT, Library 1) is a simple, elegant board game that resembles Go. The object is to surround any one of your opponent's stones with any combination of your own and your opponent's stones. The game ends when any stone is completely surrounded. Freeware. 120K.

Theater Maker (THEATR.CPT, Library 1) lets you make stand-alone QuickTime movies that automatically play when you double-click on them. Movies play within a frame, turning your monitor into a movie-theater screen, a stage, or a TV. Theater Maker includes a hook into AfterDark so you can play movies within the screen saver. Shareware, \$10. 226K.

Greg's Buttons (BUTTON.CPT, Library 3) is a System 7 extension/control panel that replaces standard black-and-white dialog-box buttons, check boxes, and radio buttons with 3-D color buttons. Requires System 7. Shareware, \$10. 18K.

Zipple (ZIPPLE.CPT, Library 3) is a control panel that replaces the Apple-menu apple icon with an animated icon of your choice. Offers a fat-bits editor so you can create your own icons. Shareware, a few dollars. 26K. 

ZiffNet/Mac Tip of the Month: Downloading Files to a PC

BinHexing is a trick you can use to download Mac files to an IBM PC or compatible — useful if you don't have a modem attached to your Mac. Normally, if you download Mac files to a PC, some of the information that makes a Mac file uniquely Macintosh — such as the resource fork, data fork, and the type and creator information — isn't translated correctly, and you end up with a generic-document icon that doesn't let you open or launch the files.

BinHexing is a way to recover a file's code, so that you can turn any file downloaded on a PC into something a Mac can recognize. To do this, you need the utility BinHex. You'll find the file BINHEX.BIN in Library 4 of the Download & Support Forum. Of course, you still need to get any file you've downloaded to a PC onto a Mac in order to BinHex it, but the Apple File Exchange utility that comes with system software lets you do that.



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The Ethernet express: 100 megabits per second to the desktop. You want it. But FDDI is too expensive, CDDI isn't a standard, and Grand Junction's Fast Ethernet (which will run over your current 10BASE-T Ethernet wiring) isn't here yet. Now Hewlett-Packard and AT&T have a design of



their own: They too are promising **100 megabits per second** over the same voice-grade twisted-pair wiring that's used by 10BASE-T, at roughly twice the cost per node of 10BASE-T — if you don't have to rewire, that is. HP and AT&T's high-speed solution will require four pairs of wire, which is double what 10BASE-T uses. Call Hewlett-Packard at 800-333-1917 or 208-344-4809 for more information.

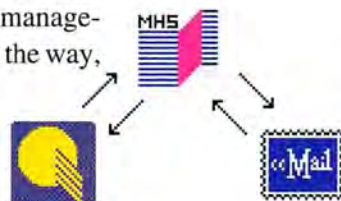
Packet-switching speedsters: No matter how much of a commodity Ethernet has become, LocalTalk remains far less expensive. The only problem is that LocalTalk's just a little short on bandwidth. Fortunately, Tribe Computer Works has a new way for you to expand your bandwidth: The company's \$1,795 TribeStar offers nine packet-switched ports — one Ethernet port and eight LocalTalk ports. Nodes on all eight LocalTalk ports can simultaneously communicate with nodes on Ethernet, providing an effective eight-fold bandwidth increase over straight LocalTalk. Worried that this would add a router to your network? Have no fear: The TribeStar isn't a router; it's a bridge. You can reach Tribe at 510-547-7800. ♦ For those who **just can't get enough** and want to increase Ethernet's bandwidth, Kalpana (408-988-1600) has an Ethernet packet switcher



called the EtherSwitch EPS-500. For \$3,500, you receive a five-port packet-switching 10BASE-T hub (an SNMP-manageable version costs \$4,000). By the way, there's no routing involved here either.

Heard it through the gateway: Odds are pretty

high that you have to deal with several different mail clients daily. If you want to reduce this number, check out the mail gateways available from StarNine (510-649-4949). Mail*Link for cc:Mail/QM connects QuickMail with cc:Mail and costs \$395 for ten users. StarNine's other new mail gateway connects QuickMail or Microsoft Mail with **the wide world of X.400**; Mail*Link for MacX.400 costs \$595 for ten users. ♦ InterCon



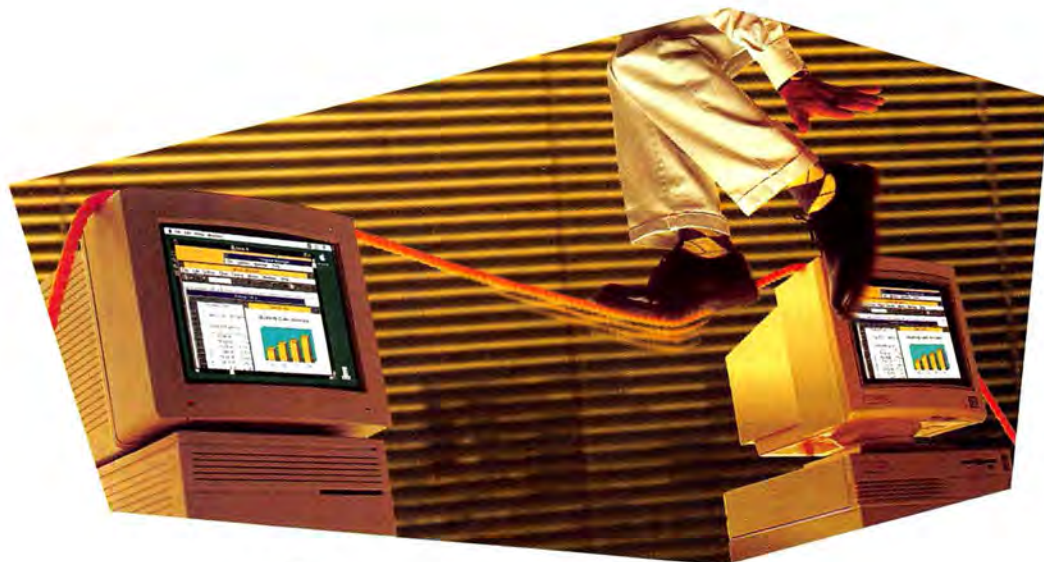
Systems (703-709-9890) also reaches out to X.400 with its gateway for QuickMail, Dispatcher SMTP for QuickMail, which costs \$995 per QuickMail server. Like StarNine's X.400 gateway, Dispatcher requires Apple's MacX.400.

ARA and the kitchen sink too: If you have to provide network access to dial-in users, you've probably concluded by this time that dial-in servers are

a good thing. Telebit's NetBlazer communication servers, which already support more protocols than you can shake a stick at, now speak the AppleTalk Remote Access protocol too. The NetBlazer ST (expandable to 18 modems) starts at \$2,399; the NetBlazer 40 (expandable to 26 modems) starts at \$4,599. 408-734-4333. ☛



By Stephan Somogyi



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New Timbuktu is the easiest way to network Macintosh and Windows computers, so you can share printers, files and screens.

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Devising Local Strategies



If you need to connect printers, PowerBooks, or other LocalTalk devices to Ethernet but a router seems like overkill, try a cheaper and easier solution: an Ethernet-to-LocalTalk converter.

By Kelli Wiseth

Gilda Radner as Roseanne Roseannadanna in "Saturday Night Live" foreshadowed the network manager's lament with her immortal "It's always something!" Say you put all your Mac workstations and your file server on a 10BASE-T network so the art folks will stop complaining about how long it takes to save files on the server. The next thing you know, everyone's complaining about the Ethernet-to-LocalTalk problem. They can't get to the QMS ColorScript or any of the other printers without being on the old LocalTalk network. But with the LocalTalk network selected, they aren't notified of incoming mail from the Ethernet network and PowerBook users can't tap in to the Ethernet network to check their mail. Switching between networks also breaks connections among users sharing files.

But don't pull out all your twisted pair — or what's left of your hair — just yet. You can easily add almost all LocalTalk fringe elements — LocalTalk printers, PowerBooks, and Macs without Ethernet cards — to your Ethernet network by using an *Ethernet-to-LocalTalk converter* — a hardware device (or software that runs on a Mac) that enables connection between a LocalTalk network and an Ethernet network. The original Dayna EtherPrint was the first of these devices, but that product could handle connection to only a single LocalTalk printer. The six products reviewed in this article — from Mac-connectivity vendors Asanté Technologies, Compatible Systems, Dayna Communications, Farallon Computing, Sonic

Systems, and newcomer Digital Products — support LocalTalk networks consisting of two to eight LocalTalk devices, not just printers.

Although these products are sometimes referred to as minirouters, converters don't perform real routing but rather just map LocalTalk addresses to Ethernet addresses not already in use. Because they don't need the sophisticated logic that routers use to process and buffer packets, converters are less costly to produce than routers are. A router generally costs about \$1,000 to upward of \$2,000, whereas these converter products are in the \$200-to-\$800 range.

Converters are also much easier to set up than are routers. To configure a router, for example, you might need to set up a seed port with network numbers and zone information, but you don't need to configure anything on a converter just to get it working (without enabling special features such as device password protection). The simple design of these products in turn results in some limitations, most notably that routers and half-routers — such as the Shiva LanRover/L — are not allowed on a LocalTalk network. All other kinds of LocalTalk devices are supported, however.

The Harder They Come

The hardware converters — Asanté's AsantéPrint, Compatible Systems' EtherWrite, Dayna's EtherPrint Plus, and Digital Products' SprintTALK/25E4 — are small, paperback-

sized boxes weighing less than 2 pounds each, with ports for one LocalTalk and one Ethernet connection. Typically, two ports are provided for the Ethernet connection: an AUI (attachment-unit interface) port for an external transceiver that connects to thicknet cabling and either a BNC port for connecting to thinnet cabling or an RJ-45 port for connecting to twisted-pair cabling. The EtherPrint-3 version of Dayna's EtherPrint product provides connections for all three types of Ethernet cabling. Regardless of the number of ports on any of these boxes, however, you can connect only one LocalTalk and one Ethernet segment at a time. The LocalTalk segment, as already mentioned, can't include routers and half-routers, but there are no such restrictions on the Ethernet side.

Although the group of hardware converters includes products from four vendors, some of them are basically the same box with different names. The Dayna EtherPrint Plus and the Digital Products SprintTALK/25E4, each of which supports four LocalTalk nodes, are identical: Digital Products currently licenses the product from Dayna but will soon be releasing a product of its own design. Digital Products has been providing print servers and other network-based printer products for PC networks since 1984; the SprintTALK/25E4 is its first attempt to break in to the Mac marketplace.

The other two hardware converters are

also more alike than their names would indicate. Asanté's AsantéPrint is essentially a two-LocalTalk-node version of Compatible Systems' Ether•Write, which supports six LocalTalk devices. Asanté licensed the design from Compatible Systems but does its own manufacturing. Unlike the other two hardware products, both the Ether•Write and the AsantéPrint have flash ROM (so called because it is changeable, rather than hard-coded, ROM), so upgrades to the unit can be downloaded easily.

A Softer Approach

The group of software converters includes two products that *aren't* clones of each other: Sonic Systems' SuperBridge and Farallon's LocalPath. In each case, the converter consists of a control panel — or a control panel and an extension — installed on a Mac. This Mac becomes the host for the LocalTalk network, which is connected to the Mac's LocalTalk port. The host Mac must be connected to the Ethernet network.

The software converters can run in the background of a user's workstation but not without causing some performance degradation of foreground applications when the converter passes packets from the Ethernet side to the LocalTalk side.

In general, the hardware converters are better performers (see Figure 1), because they're completely dedicated to a single task, and the software products, by

contrast, are the most cost-effective (see Figure 2).

Sonic Systems' SuperBridge is part of the company's EtherBridge series, which also includes LaserBridge (\$199), for connecting a maximum of five printers (but not other devices) to a Mac, and PowerBridge (\$149), for connecting a single Mac, such as a PowerBook or a Mac Classic, to the LocalTalk port of a host Mac on an Ethernet network. In addition, Sonic Systems sells more-expensive versions of SuperBridge and PowerBridge that support TCP/IP, so that LocalTalk users can access Internet services such as Telnet (for remote log-in) and FTP (for transferring files) from Macs on a LocalTalk network.

SuperBridge provides functions that are similar to those of the hardware converters, supporting a maximum of five devices connected to a Macintosh host. Farallon's LocalPath supports eight devices and also supports TokenTalk (if you have a token-ring card with TokenTalk installed in the host Macintosh). Farallon also sells PowerPath (\$149), which supports a single PowerBook or Mac; a LocalTalk-to-LocalTalk cable is included for connection to the host Mac's LocalTalk port.

Plug 'n' Play

Installing a hardware converter is clearly straightforward. Plug the Ethernet side of the network in to the correct

Figure 1: How Fast to Print?

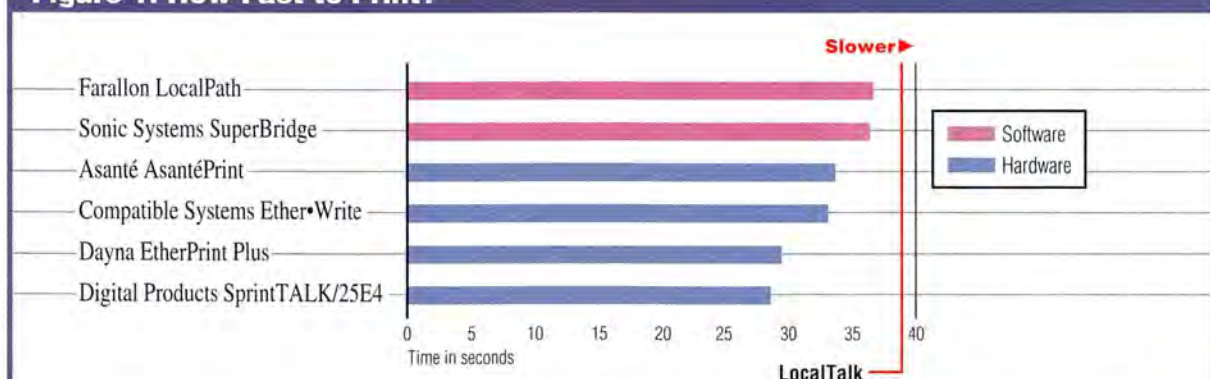


Figure 1: We tested these converters by printing simultaneously from two Macintosh IIci's on the Ethernet side of the converter to a QMS-PS 2000 printer daisy-chained to a Macintosh IIci on LocalTalk. The results show the average time it took for the data from both Macs to get through the device and begin printing compared with the time taken over LocalTalk without a device. The results are so close

that they're not very meaningful. The EtherPrint Plus and the SprintTALK/25E4 take about five seconds less than the others do, but you should keep in mind that they have problems if they're not set up right: If you don't turn everything on in the correct order — the EtherPrint Plus or the SprintTALK first — the LocalTalk nodes won't be visible to the Ethernet side.

port (RJ-45 for 10BASE-T, BNC for thinnet, or AUI through an external transceiver for thicknet); then connect the LocalTalk side of the network (containing however many LocalTalk devices the product allows) to the LocalTalk port; and finally, plug in the AC power adapter. All the boxes have either a single status light or a series of lights that flicker during power-up; in a few seconds, you'll be able to choose a printer or other LocalTalk device from a Mac on the Ethernet side of the network.

Installing a software converter is equally easy. Sonic Systems' SuperBridge consists of the EtherBridge Setup control panel and an extension file, both of which you drag into the System Folder. After opening the EtherBridge Setup control panel and entering the software serial number, you connect the LocalTalk network (of as many as five or eight devices) to the LocalTalk port and reboot the Macintosh. Farallon's LocalPath makes use of the Apple Installer utility, which also checks what versions of AppleTalk, EtherTalk, and TokenTalk you have and then upgrades them if necessary.

Once the installation is complete, further device management is minimal and optional; you can enable device-security features if the product provides them, and you may want to change the zone in which the converter resides (if you don't want to use the default zone). You perform such functions by using the management or setup software that comes with a product.

The SprintTALK/25E4 and the EtherPrint Plus setup utilities allow zone changing but have no security features, and they must be used on a Mac that's on the same network cable as the converter itself. The EtherWrite Manager and AsantéPrint Manager software can be used from any Mac on the Ethernet side, even over routers. Both versions of Manager (it's basically the same program for both the Compatible Systems and the Asanté products) enable administrators to download updates to the EtherWrite's or the AsantéPrint's software in flash ROM, change the name of the converter, and password-protect selected LocalTalk devices.

Maximum-Security Printers

Password protection is a particularly important feature for administrators of large corporate networks who consider it

Figure 2: Cost per LocalTalk Connection

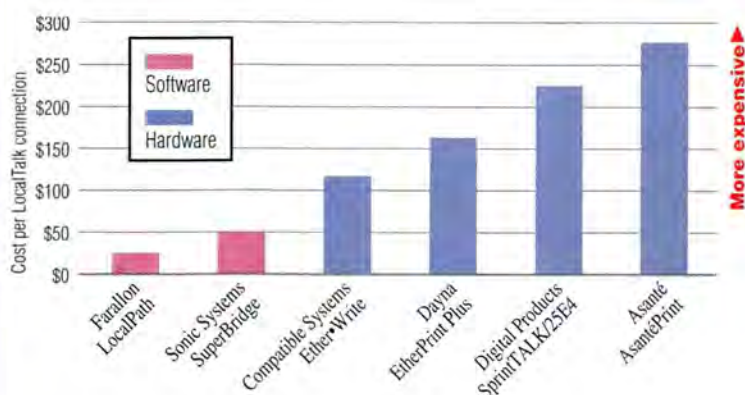


Figure 2: Compared with a router (often a \$1,000+ buy), an Ethernet-to-LocalTalk converter is a bargain. Of course, a converter can support only a limited number of LocalTalk devices, so you need to look at cost per connected device. Software converters are the least expensive, but keep in mind that they diminish performance on the host Mac.

especially important to be able to control the access users have to particular devices. Most routers provide such capability, and a few of the converters that are discussed here — the AsantéPrint, the EtherWrite, Farallon's LocalPath, and Sonic Systems' SuperBridge — provide some method of limiting access to LocalTalk devices.

The AsantéPrint and EtherWrite

Scheme. Asanté's AsantéPrint and Compatible Systems' EtherWrite each rely on a two-part security scheme; first you have to password-protect a specific device by using the Manager software, and then you can give users who require access to the device a control panel called ANSP (Advanced Networking Security Protocol), which contains the appropriate password.



Figure 3: Of all the converters, Sonic Systems' SuperBridge has the most-elegant security features. You can hide LocalTalk devices completely or password-protect them — just double-click on the name of the device in the EtherBridge Setup window, and then specify the security option and password you want. You also need to install a special control panel on any Macs that need access to the LocalTalk device.

The implementation of this two-part scheme seems a bit clumsy at first, perhaps because of the poor presentation in the manuals. Here's how it works: You install the ANSP control panel on those Macs that need access to a particular LocalTalk device, and then you enter an appropriate password. The ANSP software creates an ANSP password file, which works only on the Mac on which the file was created. Then you use the Manager software to download configuration information, including any passwords for any devices, to the EtherWrite or the AsantéPrint.

The order of these steps is important. If you download the configuration before setting up the ANSP password, you won't see the device — although if you know the name of the device, there is a workaround.

Neither of the manuals for these two more-or-less-identical products does a good job of discussing the setup and the relationship between the Manager software and the ANSP password file, although we found the technical-support people very helpful. The Asanté manual was a particularly unpleasant surprise, as Asanté's manuals are usually of high quality. The manual appears to have been hastily written and poorly proofread, as evidenced by sentences that end abruptly in midthought. However, a spokesperson for Asanté said that the company would look into this complaint and fix the problem.

Super Sonic Security. Sonic Systems' SuperBridge lets you secure LocalTalk devices in two ways: You can "hide" specific devices from the rest of the network by double-clicking on the name of the device as listed in the EtherBridge Setup control panel (see Figure 3), or you can enable password protection. As with EtherWrite, you need to install an extension — called BridgePass, in this case — on any client machines that will need access to the password-protected LocalTalk device. Users who want to print to, say, the protected printer must first select the BridgePass icon in the Chooser, then enter the password name, and finally select the printer.

Of all the products we looked at, this password-protection scheme was the most elegantly implemented, although you can't password-protect the control panel itself to prevent others from accessing it. Sonic Systems may fix this in the future, but in the meantime, there's a



Figure 4: Farallon's LocalPath contains all settings in a simple dialog box — and unlike with Sonic Systems' SuperBridge, the LocalPath control panel itself is password-protectable.

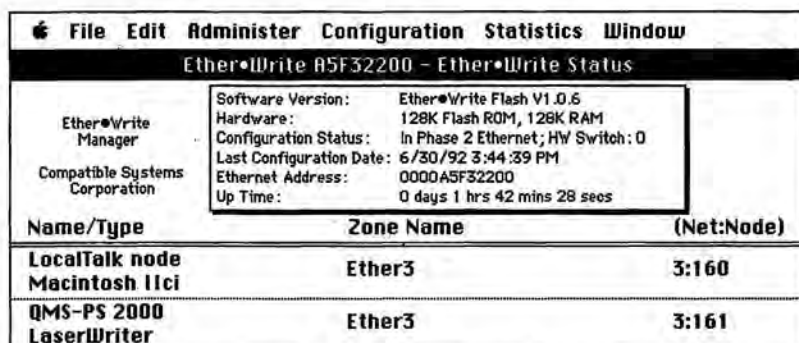


Figure 5: Both the Asanté AsantéPrint and the Compatible Systems EtherWrite use Compatible Systems' Manager software to configure and administer the hardware. You can change the zone name in which the converter resides, change AppleTalk phases, and download upgrades to ROM. EtherWrite Manager also provides usage statistics you can monitor over time to gauge performance.

simple workaround: Just discard the control panel after setting up security for the LocalTalk side. Your setup information is in an EtherBridge settings file that can't be accessed without the control panel.

Farallon's Hidden-Device Approach. Farallon's LocalPath doesn't provide the ability to password-protect devices, but you can configure the software so that only printers are displayed (see Figure 4). You might want to configure LocalPath in this manner to assure any Mac users connected to the LocalTalk side that their Macs are off-limits to the Ethernet world.

Feature-Full

Of all the products, the Manager software that comes with Compatible Systems' EtherWrite (see Figure 5) and Asanté's AsantéPrint has the most extensive set of capabilities. In addition to providing password protection for devices, downloadable software upgrades, and control of AsantéPrints or EtherWrites across routers, the Manager software also provides statistics — about packets in, packets out, and CRC (cyclical redundancy check) errors, for example — for both the LocalTalk and the Ethernet ports.

The Asanté manual for the Manager

software, although lacking in many other respects, does a good job of explaining what implications these statistics may have for your network. For example, if the CRC errors add up to more than just a few, you may have a wiring problem; Asanté suggests checking for termination on each end of the network or checking the connections at the hub. You can use the packets-in and packets-out statistics to get a general idea of how busy either port is.

The EtherPrint Plus and the SprintTALK/25E4 have no management software beyond a simple setup utility, which

you can use to change their zone location and to display a list of the four attached LocalTalk devices. These two products do have a welcome feature the other converters lack, however: Each includes a 3-foot LocalTalk-printer cable, a DB-9-to-DIN-8 adapter cable (for older Macs), and a 10-foot length of UTP (unshielded twisted pair) cable for 10BASE-T.

The Bottom Line

With an Ethernet-to-LocalTalk converter, PowerBooks, single-slot Macs, and LocalTalk printers can gracefully

become part of an enterprisewide network without the expense and hassle of a router or the snail's-pace speed of a SCSI Ethernet box.

For the lowest cost and the most portability, a software converter is your best bet — if you don't mind the vulnerability to Mac crashes and the degradation of foreground performance while the converter runs in the background on your Mac. If you need support for eight nodes or token-ring capability and security isn't a major concern, go with Farallon's LocalPath; for elegant password protection of nodes and support for as many as

Table 1: Which Converter Will Make You a Convert?

	Hardware	Compatible Systems	Dayna	Digital Products
	Asanté AsantéPrint	EtherWrite	EtherPrint Plus	SprintTALK/25E4
	\$\$\$½	\$\$\$½	\$\$\$	\$\$\$
List price	\$549	\$695	\$649	\$895
Pros	Downloadable software upgrades. Password protection of selected LocalTalk nodes. Longest warranty period.	Downloadable software upgrades. Password protection of selected LocalTalk nodes. Least expensive hardware converter per node.	Connectors and cables included. Nice manual.	Connectors and cables included.
Cons	Poor manual. Highest price per LocalTalk connection. Password protection awkward to set up.	Password protection awkward to set up.	Startup order important. Can't hide LocalTalk devices.	Startup order important. Can't hide LocalTalk devices. Most expensive.
Number of LocalTalk devices supported	2	6	4	4
Flash ROM	●	●	○	○
Licensed from	Compatible	NA	NA	Dayna
Cables included				
AUI adapter	○	○	●	●
Mac serial connector & cable	○	○	●	●
UTP cable for 10BASE-T	●	○	●	●
Software included	AsantéPrint Manager, ANSP control panel	EtherWrite Manager, ANSP control panel	EtherPrint setup utility	SprintTALK setup utility
Password protection				
LocalTalk nodes	●	●	○	○
Management software	●	●	○	○
Warranty	5 years	1 year	1 year	1 year
Company	Asanté Technologies 821 Fox Ln. San Jose, CA 95131 800-662-9686 408-435-8388 408-432-7511 (fax)	Compatible Systems P.O. Box 17220 Boulder, CO 80308 800-356-0283 303-444-9532 303-444-9595 (fax)	Dayna Communications 50 S. Main Salt Lake City, UT 84144 801-531-0600	Digital Products 411 Waverly Oaks Rd. Waltham, MA 02154 800-243-2333 617-647-1234 617-647-4474 (fax)

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BRIDGES CONNECTIVITY

five LocalTalk nodes, opt for Sonic Systems' SuperBridge (or the more expensive SuperBridge/TCP for TCP/IP support).

For greater reliability (and no Mac performance hit) at somewhat greater expense, go for a hardware converter. They all provide essentially the same throughput, so your decision should be based on the features, the warranty, and the number of LocalTalk nodes you need to support now and in the foreseeable future (see Table 1). Our favorite hardware converter is Compatible Systems' EtherWrite, which supports as many as

six nodes at the lowest per-node price of all the hardware converters — plus it lets you "hide" LocalTalk devices (although less elegantly than Sonic Systems' SuperBridge does).

Whichever converter you choose, it shouldn't be long before you hear the network complaints decrease dramatically — except perhaps those from Mr. Richard Fader, of Fort Lee, New Jersey. It's always something . . .

Kelli Wiseth, formerly a MacUser senior editor, is now a technical writer specializing in local-area and wide-area networking.

Table 1, continued

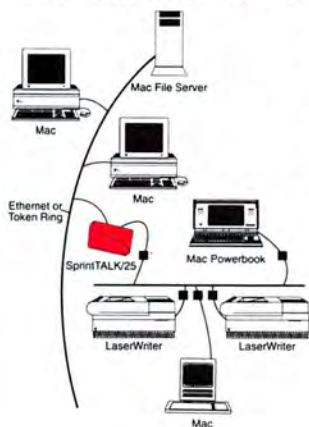
	Software	
	Farallon LocalPath	Sonic Systems SuperBridge
● = yes ○ = no	½	½
List price	\$199	\$249
Pros	Least expensive. Most nodes. Supports token ring.	Password protection of selected LocalTalk nodes.
Cons	Host Mac's performance is degraded. No password protection of LocalTalk nodes.	Host Mac's performance is degraded.
Number of LocalTalk devices supported	8	5
Flash ROM	NA	NA
Licensed from	NA	NA
Cables included		
AUI adapter	○	○
Mac serial connector & cable	○	○
UTP cable for 10BASE-T	○	○
Software included	NA	NA
Password protection		
LocalTalk nodes	"show printers only" option	●
Management software	●	○
Warranty	NA	NA
Company	Farallon Computing, Inc. 2470 Mariner Square Loop Alameda, CA 94501 510-814-5000 510-814-5023 (fax)	Sonic Systems, Inc. 333 W. El Camino Real, #280 Sunnyvale, CA 94087 408-736-1900 408-736-7228 (fax)

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	Model	Network Connections	Operating Systems	Ports	Printers	Memory	Price
SprintTALK/25	SPTLK25E	Ethernet 10BaseT and BNC ThruNet	AppleTalk	DINB LocalTalk	Up to 8 LocalTalk printers/devices	512Kb RAM, 256Kb ROM	\$545
	SPTLK25T	4/16Mb Token Ring DB9 and RJ45	AppleTalk	DINB LocalTalk	Up to 8 LocalTalk printers/devices	512Kb RAM, 256Kb ROM	\$1095
SprintTALK/200	SPTLK200E/AN	Ethernet 10BaseT and BNC ThruNet	AppleTalk/Novell	DINB LocalTalk, 1 parallel, 1 Unipoint	Up to 8 LocalTalk printers/devices, 1 parallel PostScript, 1 parallel or serial PostScript	2Mb RAM, 512Kb Flash ROM	\$1295
	SPTLK200T/AN	4/16Mb Token Ring DB9 and RJ45	AppleTalk/Novell	DINB LocalTalk, 1 parallel, 1 Unipoint	Up to 8 LocalTalk printers/devices, 1 parallel PostScript, 1 parallel or serial PostScript	2Mb RAM, 512Kb Flash ROM	\$1495

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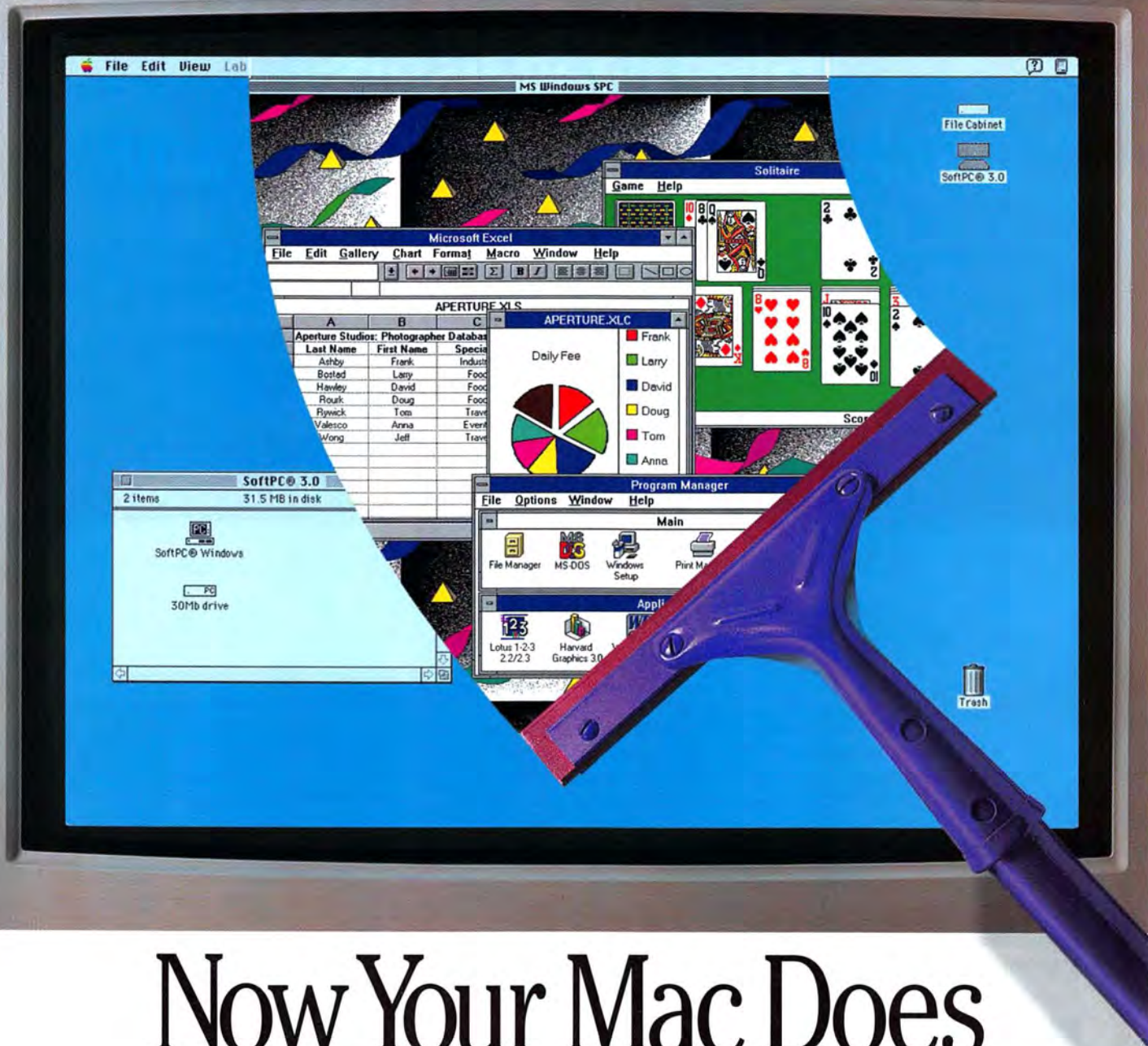
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CIRCLE 155 ON READER SERVICE CARD.

Windows in a Mac World



The cold war is over: It's time to teach your Mac to do Windows — over a network, with Farallon's Timbuktu for Windows.

By John Rizzo

Bill Gates and John Sculley may have become as chummy in public as Muscovites and Big Macs, but connections between Microsoft Windows and Macs remain few and far between. Until recently, many people on the Mac side have tried to ignore Windows — hoping, it seems, that it would go away. Even the connectivity vendors whose stock-in-trade was Mac-to-DOS products — Mac-to-DOS file transfer, Mac and DOS screen sharing, Mac and DOS operating systems on the same machine — have tended to repeat the standard caveat on the subject of graphic interfaces: “We don’t do Windows.”

But Windows isn’t so easy to ignore anymore. Sure, it’s still a Mac-interface wannabe, but version 3.1 is much more solid and usable than previous versions. And more important, Windows is everywhere you look: It’s advertised on TV, it’s bundled with PCs, and Microsoft has made a point of leasing a quarter of the floor space (well, *almost* that much) at major computer trade shows to tell you about it. Microsoft has also made sure there’s plenty of software to run under Windows, partly through events such as the Windows Programming Conference for Macintosh Developers. As a result, it’s getting harder and harder to find PCs that *aren’t* running Windows.

Although you may think the success of Windows spells ruin for the Mac community (as one after another of your favorite software companies starts putting hot new features into the Windows versions *first*), I’m here to tell you that the

news isn’t all bad. Connectivity vendors are beginning to release a new generation of your favorite Mac-to-PC connectivity programs, enabling Macs to communicate with Windows. The earlier Mac-to-DOS versions of these programs did a lot to help the nonstandard Mac get accepted into the computing mainstream, and the Mac-to-Windows versions are sure to solidify the Mac’s place in today’s multiplatform offices.

This month I tried out one of the first in this new batch of MacWindows products, Farallon’s Timbuktu for Windows 1.0. Timbuktu for Windows works in conjunction with the venerable Timbuktu for Macintosh file-transfer and screen-sharing program, now in version 5.0. With the appropriate version of Timbuktu running on each computer, a Mac and a Windows-equipped PC can trade data and applications over a shared network. This Timbuktu combination has almost everything you could want in a network-connectivity product, including ease of use, versatility, and low cost. And, of course, it does Windows — as long as the version of Windows is 3.0a or later.

Share and Share Alike

The basic function of Timbuktu has always been screen sharing — letting one or more users view the screen of another computer on a network or even control that computer from their own computers. The computer being viewed or

controlled (the host) contains settings for users, passwords, and privileges. After logging on to the host computer with Timbuktu, the other users (the guests) get a view of the host machine's desktop in a window on their own desktops. If the user on the host lets them, guests can use their own computers to control the host — to run applications, change settings, and basically do anything that a user sitting at the host machine can do.

Until now, Timbuktu host and guest computers have been Macs. With the combination of Timbuktu for Mac 5.0 and Timbuktu for Windows 1.0, hosts and guests can be either PCs running Windows or Macs. In other words, Timbuktu can make the Finder from a particular Mac appear on Windows users' screens across the network and the Windows interface from a PC on the network appear on the screens of connected Macs. In addition to viewing the foreign interface, Mac users can control Windows applications (and Windows users can control Mac applications) from their own desktops. Users can also cut and paste between applications running in the two environments.

If you've never used Timbuktu to share Mac screens, you may not realize how useful it can be to share screens across platforms. For one thing, you can access your computer and its software from other parts of a network — or remotely, from a notebook computer — without it mattering if one of the computers is a Mac and the other a PC. Screen sharing is also a big help when you're teaching Mac and Windows users concurrently how to use their respective versions of a particular program. For example, you can give a lesson in Microsoft Excel by allowing multiple Mac and Windows users to log on to your Mac (or PC) as observers. Another possibility is to use a PC as a Windows server to give Mac users access to Windows applications that don't have Mac versions (or vice versa). The only caveat is that only one guest can control the host at a time, although others can watch.

Choose Your Chooser

Timbuktu's usefulness doesn't end with screen sharing. The Timbuktu for Windows package also includes PhoneNET PC 3.0 (the latest version of the Farallon drivers that put PCs on AppleTalk networks), which gives Windows users access to Mac network services

such as shared printers, shared folders, and AppleShare file servers. PhoneNET PC 3.0 still supports DOS but now also includes a mouse-operated Windows Chooser for selecting AppleTalk printers and file servers.

Now, if you're a PC user and are rolling your eyes at the idea of putting PCs on AppleTalk, let me hasten to say that version 3.0 is a much more flexible and versatile implementation of AppleTalk than previous incarnations of PhoneNET PC. For one thing, you're not limited to LocalTalk and its slow transmission rates;

With Timbuktu, you can access your computer and its software from other parts of a network — or remotely, from a notebook computer — without it mattering if one of the computers is a Mac and the other a PC.

PhoneNET PC 3.0 also supports several dozen standard Ethernet and token-ring network-interface cards. In addition, Farallon no longer expects you to disconnect your PCs from existing NetWare networks. PhoneNET PC 3.0 is compatible with Novell NetWare, so you can run the AppleTalk and Novell IPX protocols concurrently.

This AppleTalk connection has an added bonus for Mac users calling in remotely, because it means that Timbuktu works with ARA (AppleTalk Remote Access). This enables PowerBook users, for example, to run proprietary Windows-only applications, using a modem, Timbuktu, and ARA. The user first dials in to an office Mac or an ARA server and then establishes a Timbuktu link from the PowerBook to the Windows machine on the network. This cross-platform dial-in capability is particularly handy if the only Mac you use is a PowerBook and you need to access the Windows machine on your desk back at your office.

The Ease-of-Use Question

Although AppleTalk isn't quite as plug-and-play on Windows machines as it is on the Macintosh, Farallon has done

a commendable job of making the installation process for PhoneNET and Timbuktu for Windows as simple as it can possibly be under the circumstances. The installer configures all the appropriate DOS and Windows command files for you. The trickiest part is getting the network-interface card correctly configured, but this process is no more difficult than it usually is with a PC. Timbuktu provides the drivers for all the boards it supports.

This installation process puts a Chooser icon into the PhoneNET directory of the Windows Program Manager. One little annoyance is that if you need to reinstall Timbuktu because something didn't go right the first time, the program will keep on installing Chooser icons without deleting the old ones.

After the program has been installed, Timbuktu opens when Windows is started (if you want to, you can disable the automatic start and access Timbuktu through the Windows File Manager as `tb2.exe`). As with the Mac version, you can add users' names and set their privileges and passwords for the four basic Timbuktu functions: Control, Observe, Send Files, and Exchange Files (where file exchange takes place, using designated To and From folders). To take advantage of the Mac file-server and printing-service accessibility PhoneNET PC provides, you need to use the Chooser icon in the Windows Program Manager. However, because using the Timbuktu Send Files function is faster than uploading a file to an AFP (AppleTalk Filing Protocol) volume, you'll probably want to use Send Files for all of your file transfers.


Timbuktu for Windows looks and works very much like the Mac version, with just a few small interface differences. For example, Timbuktu for Mac 5.0 separates the Guest Access field from the Connection field (where you choose the Timbuktu users on the network to whom you wish to connect). Timbuktu for Windows uses a single window for both fields, which takes up a little more screen area, because you can't hide the field you're not using.

Other differences arise from the need to make Timbuktu for Windows act as Windows users would expect it to, which Farallon has done quite logically. After you log on to an AFP file server, for example, the volume acts the way an ordinary Windows network volume

would, becoming the D drive in the Windows File Manager.

Like the Mac version, the Windows version of Timbuktu has lots of handy ease-of-use features. An icon flashes when a guest is logged on to your machine, and unique icons tell you whether your guest is sending files, exchanging files, watching your every move, or controlling your computer. To make it easy for guests to log on, Timbuktu for Windows' connection documents are double-clickable icons that establish predefined connections with particular computers, behaving much like System 7 file-server aliases.

Détente Details

For giving Macintosh and Windows users access to each others' files and applications over a network, this new Macintosh/PC Timbuktu pair is a winner. Despite the overhead of Windows 3.1, performance of the Windows product is snappy — in fact, in our tests, Timbuktu for Windows 1.0 ran faster on a 33-megahertz 386 Compaq than Timbuktu for Mac 5.0 did on a Macintosh IIci. In case the \$199-per-copy price for either version seems too high for outfitting all the users on your network, you may want a multiuser pack. Farallon offers discounts for packs of 2 (\$299), 10 (\$999), 30 (\$1,999), and 100 (\$5,500). Owners of older versions of PhoneNET PC can upgrade to Timbuktu for \$59. PhoneNET PC version 3.0, which comes as part of Timbuktu for Windows, is also sold separately for the same \$199 that the full Timbuktu package costs, but only a die-hard cold warrior would pass up the opportunity to get Farallon's platform-crossing perestroika product at no extra cost. 

John Rizzo, a MacUser technical editor, is the author of MacUser Guide to Connectivity, published by Ziff-Davis Press.



Timbuktu for Windows 1.0 and Timbuktu for Mac 5.0

Published by: Farallon Computing, Inc., 2470 Mariner Square Loop, Alameda, CA 94501; 510-814-5000.

List Price: \$199; 2-user pack, \$299; 10-user pack, \$999; 30-user pack, \$1,999; 100-user pack, \$5,500.



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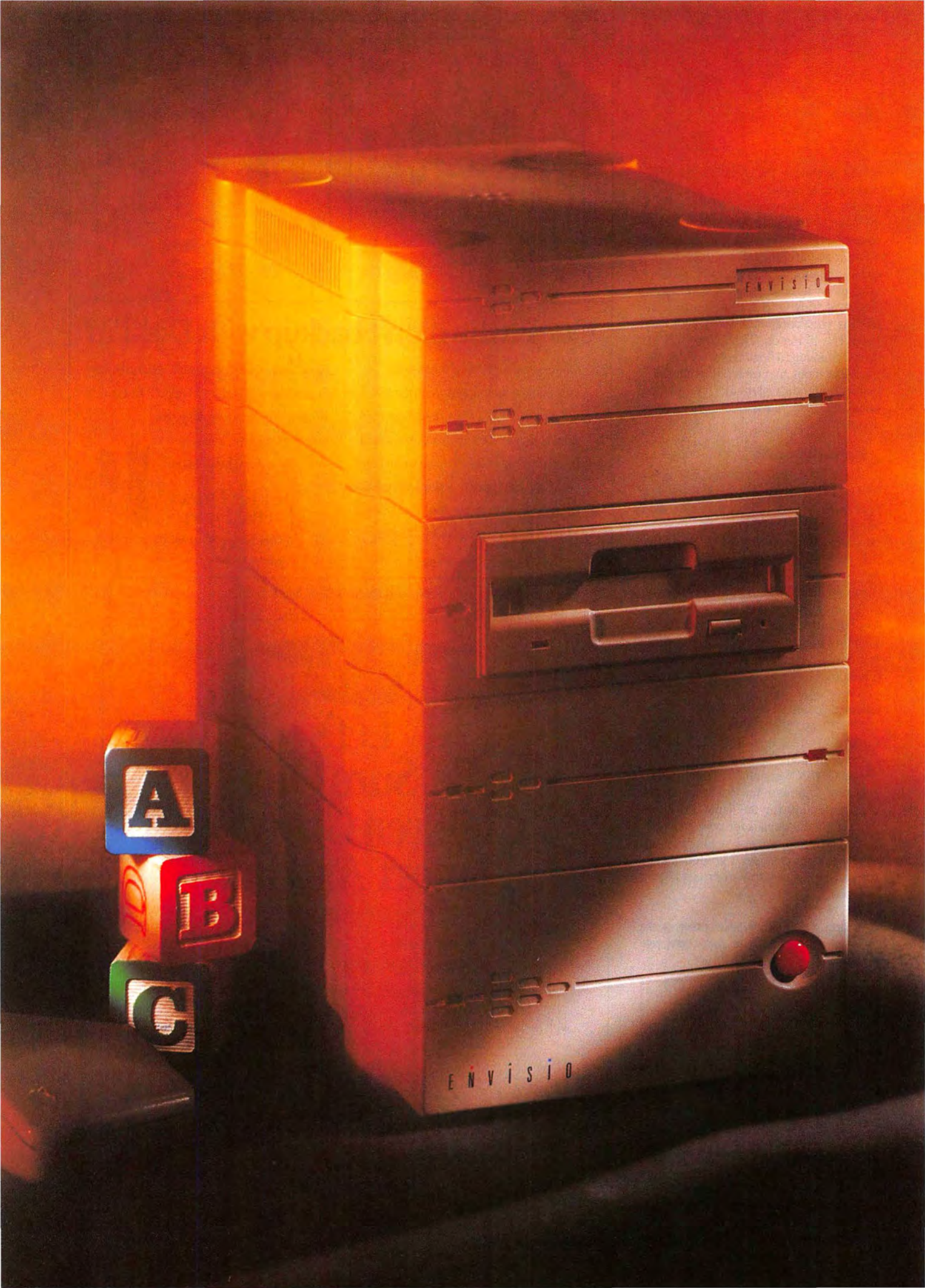
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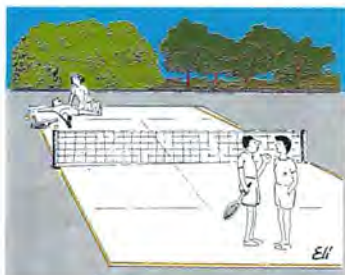
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PERSONAL MACINTOSH

New Toon-Up: Don't panic — it's not another incremental improvement to the Macintosh's



"The server's down."

operating system. We're referring to the cartoons of *MacWEEK's* Eli, whose slightly twisted perspective on Macintosh computing is thoroughly document-

ed in *ToonWare: A Humor Interface* (Berkeley, California: BMUG, Inc., 1992). For \$6.95 you get 89 **wry and informed** cartoons. But what we want to know is, if Cathy can have a daily planner, why not Eli? He needs only 276 more toons . . . 510-549-2684.

Once upon a time:

Back when an "educational" Mac was an SE at best, a black-and-white program called Alphabet Blocks, from Bright Star Technology, featured a talking elf who helped preschoolers **learn their ABCs**. The read-my-lips technology behind Alphabet Blocks and Bright Star's other programs (remember *At Your Service?*) never really caught on. That could change, however, now that Bright Star has been acquired by Sierra On-Line. The first product to appear since the acquisition is a vastly improved color version of Alphabet Blocks (still \$49.95),



with the elf replaced by two ultrachirpy new characters: a jack-in-the-box and a chimp. It's been a solid hit with our underage experts. At the same time, look for Bright Star's technology to show up in new games from Sierra On-Line. 209-683-4468.

♦ Wondering which educational program out there meets your particular needs? Check out *Pride's Guide to Educational Software* (Wheaton, Illinois: Crossway Books, 1992), by Bill and Mary Pride. It's a **comprehensive compendium** (not just Mac) of ratings and hands-on evaluations of 750 educational programs. Everything from preschool to adult education is included, so for \$25, you can look up anything from Just Grandma and Me to

Interactive Physics. 708-682-4300.

An extraterrestrial upgrade:

Whichever alien civilization first intercepts the Voyager spacecraft and its gold-plated LP of sounds of the earth will probably be **plenty perplexed** that our society didn't bother to invent compact discs before

launching the darn thing. Thankfully, that's been corrected now, with the release of *Murmurs of Earth: The Voyager Interstellar Record*, a \$59.99 set of two CD-ROMs from Warner New Media that contain all the original sounds, music, photos, and congressional-committee lists from the original Voyager record. And like any good CD reissue, this one comes with some bonuses: You'll receive an updated copy of the book *Murmurs of Earth*, by Carl Sagan and other xenophiles, and a collection of color photographs taken by Voyager as it visited the outer planets of our solar system. 818-955-9999. 🐼

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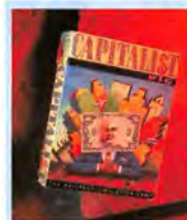
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Publisher:
Micromat
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ScanMaker series provides a simple and affordable way to bring color and black-and-white images into your computer at resolutions up to 1200 dpi, and scans color photographs or artwork in full 24 bit color or 256 shades of gray. The ScanMaker II is bundled with Adobe Photoshop LE. The ScanMaker II XE is great for scanning color or black-and-white images and is bundled with a full version of Adobe's Photoshop, the premier image processing software for the Macintosh.

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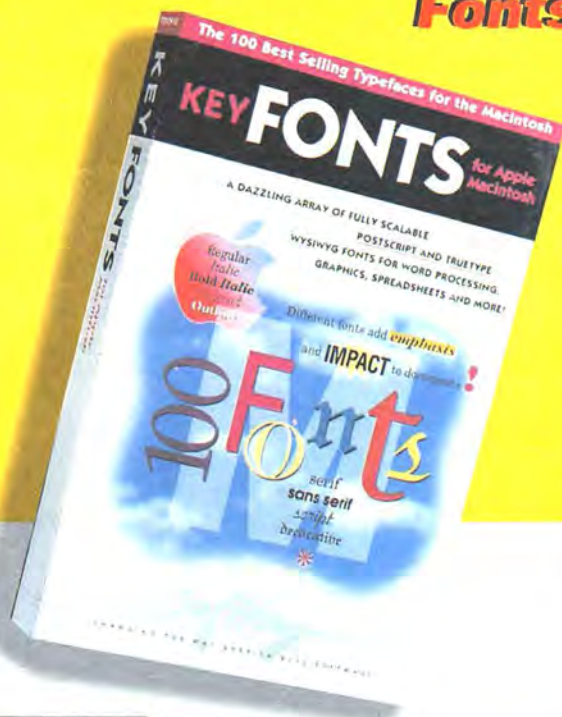
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FON 0480

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*Some of the programs are Shareware, so you can use them free of charge. Some authors do ask for a small fee. Six of the programs are absolutely FREE! See details on the disk.



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Requires: 2 MB RAM under System 6, 3 MB under System 7.
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GRA0268 Kid Pix 1.2	35.
Centron Software, Inc.	
ENT0329 BlackJack Strategy Tester/BlackJack Ace	65.
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HyperGlot Software Company	
Word Torture: Spanish, French, German, Russian	ea 35.
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Number Monarchs or Word Monarchs	ea 19.
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Opcode Systems, Inc.	
MUS0107 Audioshop	65.
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EDU0355 Stickybear's Reading Room	35.
Passport Designs, Inc.	
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MUS0119 MusicTime w/ TRAX	169.
Penton Overseas (Full line available)	
Picture II Level I: Spanish, German, French, Italian	ea 42.
VocabuLearn/Level I, II or III: French, German, Hebrew, Italian, Japanese, Russian or Spanish	ea 35.
Personal Training Sys. (Full line available)	
Excel 4.0, Word 5.0, Quark XPress 3.1	ea 35.
Plura Software	
ENT0447 Capitalist Pig 1.1	35.
Software ToolWorks	
MUS0092 Miracle Piano	349.
XOR Corporation	
ENT0274 MacGolf Classic 1.1	52.
Zondervan Publishing House	
MacBible-Greek, NIV or King James Version	ea 79.

ADobe Systems, Inc. (Full line available)

ENT0351 Adobe Type On Call 2.0	59.
ENT0352 Adobe Type Reunion	41.
ENT0439 Adobe TypeStyle 2.0 w/ATM	127.
Softkey Software	
FOU0480 KeyFonTS	49.
Wayzata Technology	
FOU0484 Font Fun House CD-ROM	35.

GRAPHICS & MULTIMEDIA

Abacadata	
CAD0032 Design Your Own Home-Architecture	ea 59.
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Adobe Systems, Inc.	
GRA0371 Adobe Premiere 2.0	439.
GRA0403 Illustrator 3.2 (w/ ATM 2.0)	369.
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Aldus	
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GRA0354 IntelliDraw	199.
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GRA0112 SuperPaint 3.0	99.
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GRA0347 QuickTime Starter Kit	149.
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MacGlobe or MacUSA	Call.
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CAD0029 ClariCAD 2.0	599.
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SID0014 MacDraw Pro 1.5 Trade-up	95.
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GRA0380 Renaissance	499.

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Prometheus

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ALSoft	
UTI0269 ALSoft Power Utilities Bundle	65.
Apple Computer, Inc.	
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LNG0057 Mac Programming Fundamentals	449.
SYS0004 System 7.1 Personal Upgrade Kit	79.
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ASD Software, Inc.	
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UTI0251 Help 1.03	89.
TGS Systems	
UTI0053 Program 2.5 Compiler Ver.	299.
UserLand Software, Inc.	
UTI0319 UserLand Frontier 2.0	189.

WORD PROCESSING

Clarix	
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Microlytics	
WRD017 Word Finder Plus 4.0	45.
Microsoft	
WRD0059 Word 5.1	295.
UPG0001 Word 5.0 Upgrade	125.
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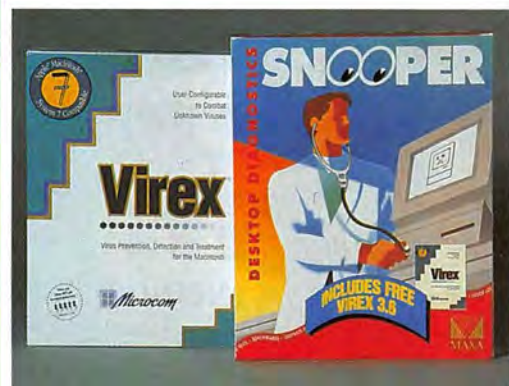
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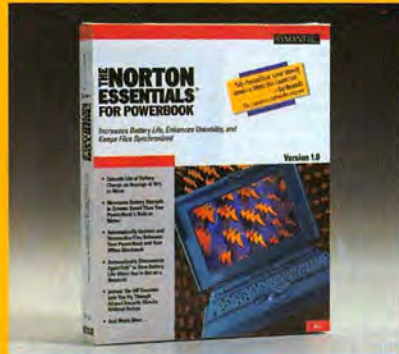


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❶ Snooper 2.0 detects hardware problems and sources of intermittent failures. It performs over 200 major component tests, prints the results, and logs errors. It also does benchmark testing and reports on system configurations to allow technicians to find and fix problems quickly. Includes a NuBus card to check errors even when the screen displays a "Sad Mac." Now includes Virex FREE!

**Requires: 2MB RAM.
Publisher: MAXA
UTI0337**

\$179



Norton Essentials for PowerBook

❶ Norton Essentials for PowerBook is the most comprehensive utility package designed specifically to make the Macintosh PowerBook more efficient. It is a collection of 12 utilities that serve three main purposes: increase the life of the PowerBook battery charge an average of 40% or more, enhance general PowerBook productivity and useability, and keep files synchronized between a PowerBook and any other Macintosh. Features include Airport Shutdown, Backlight Dimmer, Battery Gauge, Battery Saver, Instant Access for AppleTalk, Quick Notes, SyncIt! and much more—all quickly accessible from the control panel.

**Publisher:
Symantec
UTI0341**

\$89

Bridge 7.0

❶ Bridge 7.0 pits you and your partner against two opponents on your Mac. Improved color graphics and screen layouts, plus enhanced bidding and play, make it more fun. Your computer opponents have their own personalities, and digitized speech. Bridge 7.0 recognizes the stayman and blackwood conventions and allows you to adjust the style from conservative to aggressive. **Publisher: Artworx**

ENT0461
Also available: **Grail Quest**—A graphic adventure.
ENT0262 \$19.
KaleidoKubes—A mind-bending game.
ENT0417 \$12.



\$35



InTouch 2.0

❶ InTouch 1.1 was rated "the best name-and-address DA for the Mac," MacUser Magazine, 4/91 (4.5 Mice rating). New InTouch 2.0 is even better! Version 2.0 adds an integrated reminder program, sorting, list view, phone books, fax cover sheets and much more. InTouch stores unlimited names, addresses, phone numbers and notes. The reminder program will notify you about that important meeting or phone call—it will even find the contact's number and dial it automatically. Sort your contacts into groups for easy printing of address books, mailing labels or envelopes. Share contacts with the Lightning fast InTouch network.

Publisher: Advanced Software UTI0291
Also available: **DocuComp II DTP0081 \$99.** and **InTouch 2.0 Network 3PK UTI0307 \$139.**

\$59



Fractal Design Sketcher™

❶ Sketcher lets you faithfully duplicate the expressive line and texture of a soft lead pencil on rough sketch paper—or the luminous glow of oil paints that have been layered on a fine-weave canvas. Pencils, chalks, charcoals, calligraphy pens, spray paint and a variety of brushes for oils and water color are all available—along with a wide range of drawing surfaces. There's also photo retouching, cloning effects, type effects, "tracing paper" (it allows you to draw and paint over an existing image), extensive import/export capabilities, and support of any PostScript printer or QuickDraw device.

**Publisher:
Fractal Design Corp.
GRA0393**

\$99

PICTure This 2.0

❶ PICTURE This translates over 24 formats created on the PC, SUN, Amiga, X Windows, Apollo, Silicon Graphics, and Macintosh platforms to PICT/PICT2. Supported formats include PCX, TGA, CGM, TIFF, IFF, GIF, BMP, Silicon Graphics RGB, and more. This feature-rich user interface boasts such capabilities as batch processing, automatic file sensor, accurate translation of color, Save to Clipboard, a built-in viewer, and many options for customizing the output file. PICTURE This is ideal for organizations that produce graphics, documents, and presentations in a multiplatform environment. XTND and Canvas Interface tools also available.

**Publisher:
FGM Softworks, Inc.
GRA0352**

\$85



MacKids Preschool Pack 2.0

❶ The MacKids Preschool Pack 2.0 uses color, graphics, and animation to teach basic skills, such as the ABCs, and the 1-2-3s, in a light and entertaining way. AlphaWorks teaches letter recognition and keyboard layout. Bar Math teaches the basic concepts of numbers using blocks. Concentration develops short term memory skills as players try to match picture cards. Connect the Dots teaches number and letter sequence, Counting 1,2,3 develops counting skills, and ShapeWorks teaches shape recognition. Now in color and System 7.0 compatible.

**Publisher:
Nordic Software
EDU0142**



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UserLand Frontier 2.0

With UserLand Frontier, you don't have to choose between pretty icons and the power to customize and automate your Macintosh. For the first time, you can have power and ease-of-use. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When you're done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop.

Publisher: UserLand
UT10319

\$189



Infini-D 2.0

Create dazzling images with the power of Infini-D's Three-dimensional environment. The easy-to-use Infini-D, now in an awesome second generation! Infini-D 1.0 was the package that brought 3D graphics to the rest of us. Infini-D 2.0 combines this friendly interface with sizzling 3D power: Infini-D's incredible new shader and raytracer now can render scenes up to 500% faster! Instant conversion of EPS files into 3D objects, Infini-D's awesome metamorphosis capabilities, precise PICT mapping control, and extensive QuickTime support make Infini-D 2.0 the 3D package of choice for graphic arts and multimedia professionals.

Publisher:
Specular International
GRA0303

\$699



QuickKeys 2v 2.1

QuickKeys 2v 2.1 allows you to use System 7.0 Apple Events to communicate with, and control, other software. It enhances the capabilities of Apple Events aware software and bridges the gap to software not yet upgraded. QuickKeys 2v 2.1 works across applications, so you can ask them to find and process data, and send it back to you for use

in your currently open document. Even better, you can set up a QuickKeys macro to do this for you automatically every week. QuickKeys is 32-bit clean, and supports System 7.0.

Publisher: CE Software
UT10188

\$94

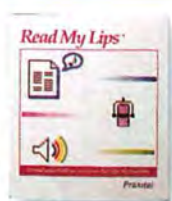


Read My Lips 3.0

Record sounds in the Finder and create double-clickable files that playback the sounds, or attach QuickTime movies to your documents and play them back from within your documents. With System 7 and the new Read My Lips, you can record voice annotations and attach them to your documents, or use prerecorded sounds. Works with most word-processors, integrated DP and presentation applications.

Publisher: Praxitel
UT10211

\$75



Sketch! 1.5

Alias Sketch! combines powerful modeling, composition, texture, mapping, perspective matching, lighting and rendering features into one complete package. Version 1.5 includes hole-cutting, 100% performance increase, enhanced texture map placement, and seamless integration with illustration, image processing, RenderMan, 3D modeling and animation programs.

Requires: Any Mac II;
8MB RAM; hard disk
Publisher: Alias Research
GRA0363

\$759



PUBLIC UTILITIES

Public Utilities

Public Utilities automatically examines your hard disk while you work. It checks for common problems (bad sectors, corrupted data, and damaged directories) and alerts you when it finds them. It also suggests how to fix the problem (or at your option, corrects problems automatically). It scans disks at selected time intervals, or by manual command. Public Utilities is safe to use, even if the power goes off unexpectedly. The package includes the diagnostic utilities, and a disk optimizer (defragmenter), plus undelete, backup, security, and compression utilities.

Manufacturer:
Fifth Generation
UT10325

\$99



Smartcom II for the Mac

Activate the major functions with just a click on an icon. Connect to another Smartcom II user and exchange graphics. AutoPilot records frequently used sequences, and provides a simple interface for all

the advanced features of Hayes Smartmodem and V-series products, including the ULTRA 96. Now supports System 7.0.

Requires: Any Hayes-compatible modem.
Publisher: Hayes
COM0015

\$84



WordPerfect 2.1

WordPerfect® 2.1 represents graphic improvements to word processing. WordPerfect 2.1 has a graphics and drawing package built in. Incorporate graphics without leaving your document. You can create, edit, size, scale and crop graphic figures by clicking "graphics" or "draw" on the pull-down menu. Comes with 36 border styles, macro editor and stylesheets, new extended columns, improved text wrap, and it's System 7 savvy. The Styles commands let you define fonts, sizes, and text from newsletter headings.

Publisher:
WordPerfect
Corporation
WRD0041

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Publisher: After Hours Software
BND0150

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Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ \$49 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 150ns or faster
2 MB	Remove all four existing 256k SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs.
To upgrade a 8-socket Mac II, Ix, Icx, Ix/30 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 120ns or faster
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a 4-socket Mac IIfx to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 100ns or faster
5 MB	Install four 1 MB SIMMs.
To upgrade a 4-socket Quadra 700 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
8 MB	Install four 1MB SIMMs.
To upgrade a 16-socket Quadra 900 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
4 MB	Install four 1MB SIMMs.
8 MB	Install eight 1MB SIMMs.
12 MB	Install twelve 1MB SIMMs.

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is \$49.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

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Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just \$3.

CHP 0012 120ns SIMMs.....\$49

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If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

TWO YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for two years from the date of purchase. We will repair the item or replace it at our discretion.

* SIMMs prices vary. Call for latest information.

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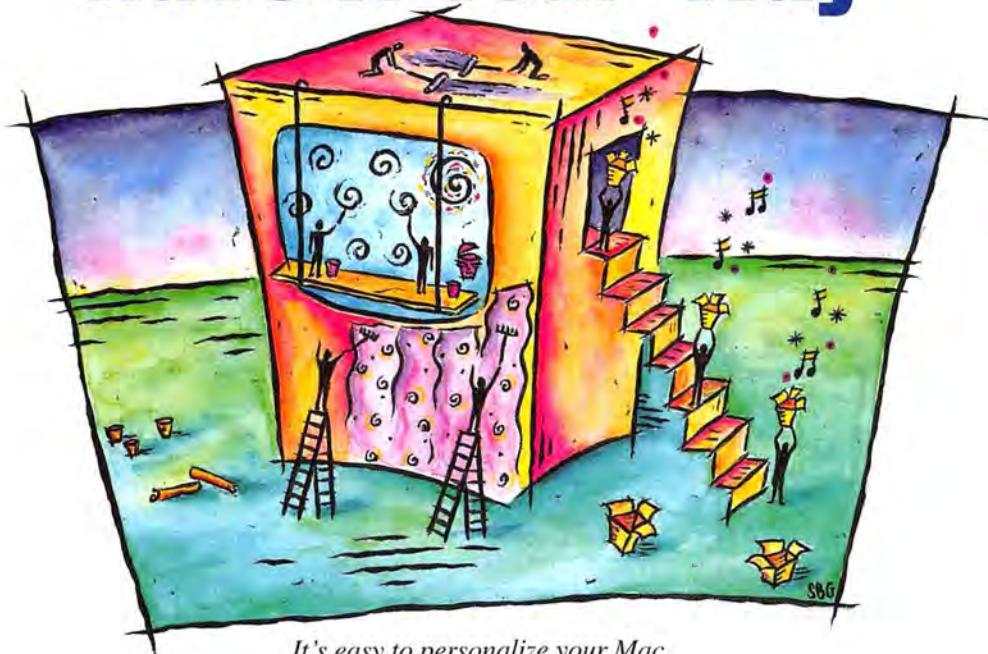


The hammer1000FMF is available exclusively at authorized Hammer dealers worldwide. For more information and the name of the Hammer dealer nearest you, call FWB at (415) 474-8055, or fax us at (415) 775-2125.



HAMMER

Have It Your Way



*It's easy to personalize your Mac
without emptying your wallet.*

By Bob LeVitus

Right out of the box, every Mac looks pretty much like every other. It doesn't have to stay that way, though. Tons of programs are available that can make your Mac's interface uniquely yours. You can change your startup screen from "Welcome to Macintosh" to a picture of your kids or grandkids. You can change the boring gray desktop pattern to something more colorful and lively. You can transform uninteresting icons into miniature works of art. You can even change your tiresome beep sound to something . . . well, let's just say you can change it. This month, we'll look at some of the best shareware and inexpensive commercial programs for accomplishing these Mac makeovers.

By the way, I have friends who would argue that the programs I'm about to describe can make your Mac look and sound better. But beauty is in the eye of the beholder, and I've seen (and heard) some ugly Macs. So let's just say this is a column about changing the way your Mac looks and sounds.

In the Beginning

We'll start with the first thing you see when you turn on your Mac. Ordinarily, you're greeted by a little rectangle with an Apple logo and the words "Welcome to Macintosh." Booooring. Fortunately, it's easy to replace that "Welcome to Macintosh" with a cool custom startup screen. All you need is a program that can save a graphics file in the StartupScreen format.

Here's how it works: Create a picture, and then save it in

StartupScreen format (use the Save As command). Name the file *StartupScreen* (no space in the middle, capital S in *Screen*), and put this file into your System Folder. When you restart, instead of "Welcome to Macintosh," you'll see your picture.

It's fun and it's easy. The best program I know of that can save a file in the StartupScreen format is GIFConverter, Kevin Mitchell's killer shareware graphics-conversion program (which you can get from on-line services or user groups, or by sending \$40 to Mitchell at P.O. Box 803066, Chicago, IL 60680). Don't be fooled by its name — in addition to converting files to GIF (Graphics Interchange Format, a machine-independent file format that can be viewed on Macs, PCs or PC-compatibles, and several other types of computers), GIFConverter can open and save files in StartupScreen and many other file formats, including EPS, MacPaint, PICT, RIFF, RLE, Scan Image, and TIFF. Not only can it convert any of these file formats to any other but it also includes image-enhancement tools for scaling, stretching, gamma-correcting, inverting, equalizing, and adjusting contrast and brightness.

You may already own a program that saves in the StartupScreen format; several graphics programs do. Color MacCheese (Delta Tao), SuperPaint (Aldus), and Canvas (Deneba) are three I found on my hard disk, but I know others support it too. Open your favorite graphics program and choose Save As or Export from the File menu. If one of the choices is StartupScreen, you're golden.

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PERSONAL MACINTOSH PERSONAL BEST

The Sound of Sounds

The Sound control panel, which comes with your system software, is brain-damaged — all it can do is change your beep sound. Big deal, right? That's why the shareware program SoundMaster, from Bruce Tomlin (15801 Chase Hill Blvd., Suite 109, San Antonio, TX 78256), is so popular.

SoundMaster is a control panel that lets you assign different sounds to such events as startup, shutdown, disk insert, disk eject, empty Trash, copy done, and many others. It doesn't come with any sounds of its own, but you can find plenty of them on-line or in user-group software libraries, or you can record your own if your Macintosh has built-in sound recording (as do all currently shipping Macs except the IIfx).

Because my Macintosh IIfx didn't come with built-in sound recording, I used a MacRecorder Sound System Pro, from Macromedia (600 Townsend Street, San Francisco, CA 94103; 415-442-0200. \$349, including the excellent SoundEdit Pro software), to record a bunch of dialogue from the movie *Terminator 2*. Now, when I restart my Mac, I hear Arnold's mellifluous voice informing me, "I'll be back." When I shut down, Arnold says, "Hasta la vista, baby."

Modifying your Mac's sound is easy and enjoyable, and there's no end to the fun you can have with SoundMaster. You can obtain a copy from on-line services and user groups. Shareware registration is \$15; for \$20 you also get a disk with the latest version.

I Think Icon

Icons are one of the easiest and most fun things to customize on your Mac. Some of you old-timers will remember the bad old days before System 7, when there wasn't much you could do to your icons without messy ResEdit hacking. But that's all in the past — these days, System 7 makes customizing icons as easy as copy-and-paste.

I love editing and colorizing my icons. Believe it or not, these days you can do it with nothing more than a painting program. Here's how, in ten easy steps:

1. Select an icon for any file, folder, or disk.
2. Choose Get Info from the File menu (or type Command-I).
3. In the Get Info window, click on the icon once to select it.
4. Choose Copy from the Edit menu

(or type Command-C).

5. Create a new document in any painting program.

6. Choose Paste from the Edit menu (or type Command-V).

7. Modify the icon.

8. Select the icon and copy it.

9. Return to the Get Info window, click on the icon, and paste.

10. Close the Get Info window.

Presto — that file, folder, or disk you selected now sports your redesigned icon. You can also copy icons from one Get Info box to another.

To make your own icons, use the same technique. My wife is a decent artist, and she created a set of Disney icons for my Mac — Cinderella, Cruella de Ville, and others — using this method. The only trick is to make sure your artwork is smaller than 32 x 32 pixels.

If that seems complicated, you should know that there are several shareware programs, such as IconBOSS and iContraption, to help you create and edit icons. IconBOSS is easier to use; iContraption is more comprehensive.

And commercial software publishers are about to climb onto the icon bandwagon. At least two commercial icon-editing and -managing programs should be available by the time you read this — Icon 7, from Inline Design/Microseeds, and I Like Icon, from Baseline.

Before we leave the subject of icons, here's one final tip: If you use File Sharing, you'll have to turn it off to edit the icon of any disk with a shared file on it.

For a Little More

Although many great customizing programs are distributed as shareware, if you're willing to pay just a little more, you can get some truly amazing enhancements for your Mac. Among my favorite commercial programs are Thought I Could's Wallpaper and Sound Source's Star Trek sound collections.

Wallpaper is billed as an "interior decoration program for your Mac's desktop." It lets you display, create, edit, and save an unlimited number of large, repeating desktop patterns in black-and-white or as many as 256 colors. You can choose from one of the hundreds of included patterns, most of which are quite attractive. There's even a randomization feature so you can have your Macintosh automatically change patterns as often as you like. For those who don't want to create their own patterns, hundreds of patterns are included

with a purchase and hundreds more are available by subscription from Thought I Could.

Wallpaper is a control panel; it uses just a little more than 100K of RAM and works on any Mac with color QuickDraw (the SE/30, Classic II, Mac II series, Quadras, and PowerBooks). I've been using it for more than a year now, and it's garnered me more compliments than all my other customizations combined. It has also performed flawlessly. Whenever I take my hard disk somewhere for a demo, the first thing people ask is how I got my desktop to look so beautiful. The answer, in a word, is "Wallpaper."

To Loudly Go . . .

A recent trend is for professionally recorded sounds to be sold as commercial software; Sound Source is the pioneer in this field, with AudioClips, which are collections of sounds, sound effects, dialogue, and music from original television shows and movies such as "Star Trek," *Star Wars*, and *2001: A Space Odyssey*. Two things make them special. First, they're extremely well produced — digital recordings from the original master tapes — and they also come with the latest version of SoundMaster. No shareware payment is necessary if you get your version of SoundMaster with an AudioClips volume.

Second, unlike the sound clips you find on-line or in user-group libraries, these are fully licensed and legal. I looked at two volumes from the original "Star Trek" series: The Logical Collection (all you'd expect in a debut library) and The Final Frontier (for seasoned Trekkies). Each includes about 50 sounds. In addition to the famous "Star Trek" theme, you'll discover bits of dialogue and interesting sound effects. My favorites include such snippets of dialogue as "The warp drive is a hopeless pile of junk" and "Disengage

this computer now." I've been known to use the warp-drive sound for my disk-eject sound and the disengage sound as my shutdown sound.

Home-Office Mac

Home-office workers spend a lot of time in front of their computer. That's because we tend to use them for everything — writing, data entry and retrieval, accounting, and so on — and we don't have secretaries or assistants to handle these keyboard-intensive tasks for us. So we do it ourselves and spend entirely too much time at the keyboard.

There's no doubt that a wrist rest — a slab of foam or other soft material that sits in front of your keyboard for your wrists to rest on — can reduce strain and pain in your hands, wrists, and forearms. I like the WristSaver (L B Innovators, 2524 Main Street, Suite H, Chula Vista, CA 91911; 619-423-6644. \$19.95), an ergonomically formed hard-plastic shell with a soft foam coating on it.

But you use your mouse or trackball as often as you use your keyboard, so you also need a pad for the hand that moves the mouse or trackball. The best one I've seen for a mouse is called Mouse Paw (Marty's Computer Workshop, P.O. Box 550, Kendall Square, Cambridge, MA 02142; 617-491-6935. \$7.95). It clips on to your mouse and provides a small cushion for the heel of your hand. Try it — you'll be surprised at how good it feels.

Several companies sell short wrist rests that sit in front of the trackball. Or you can do what I did — order a pair of WristSavers, put one in front of your keyboard, and saw the other into three equal-sized pieces. ☐

Bob LeVitus is the author of *Dr. Macintosh, Dr. Macintosh's Guide to the On-line Universe*, and lots of books with the word *Stupid* in the title.

Directory

Wallpaper

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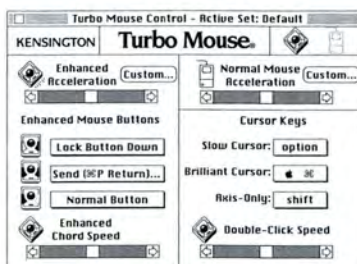
With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let

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The Missing Modem



*Internal modems for PowerBooks are available in quantity —
unless, that is, you own a Duo.*

By Henry Bortman

If you own a PowerBook Duo, you probably don't have an internal modem yet. That's because you can get one from only one company: Apple. And Apple's internal modems weren't finished when the Duos began shipping. In fact, at press time, nearly two months after the Duos' introduction, they still weren't shipping. And although PowerBook 100 owners can choose from among nearly a dozen vendors of internal modems, not a single third-party vendor has announced one for the Duo.

There's an interesting story behind this.

When Apple announced the PowerBook 160 and 180 and the Duo 210 and 230, it also announced Express Modems. Capable of 14.4-Kbps data transmission and 9,600-bps fax send/receive, these modems caused quite a stir by virtue of their incredibly low price: \$319. You might wonder how Apple can sell its modems for hundreds of dollars less than the going price for competitors' products. Answer: It implemented in software a big chunk of a modem's functionality that is normally implemented in hardware. Why did it do this? To keep the cost down.

You might wonder what's wrong with that. To answer that question, you have to take a look under the hood. Typically, modems — even internal modems — communicate with computers through a standard serial interface. This makes it relatively easy for third-party modem vendors to build modems for new computers without having to start from scratch

each time. But Apple didn't take that route with the Express Modem. The internal interface to the Express Modem is decidedly *nonstandard*: Any vendor that wanted to make an internal Duo modem would need extensive technical specifications. Unfortunately, at press time, Apple hadn't made the details of how the interface works available to third-party vendors.

Not only that, but Apple opted to put so much of the modem in software that there's really not much left for third parties to do in the hardware department except make a clone of the Apple modem. This raises serious questions about whether Apple's approach makes it technically feasible for third-party-modem vendors to build hardware products for the Duos that are innovative enough to be distinguishable from Apple's Express Modem. Voice capability is one example of an advanced modem feature that may not be easily supported by the Duo technology.

An Express to Nowhere

Apple's response to this situation is to tell third-party vendors that, with the Duos, their opportunities shift from modem hardware to modem software. A survey of nearly a dozen PowerBook-modem vendors, however, revealed that although most of them design and build their own modem hardware, the majority license telecommunications and fax software from outside sources. Several of these vendors bundle stock

versions of MicroPhone 1.7 for telecommunications and FAXstf for fax send/receive. And it's not all that easy for a company to flip from being hardware-based to software-based; the skills required are very different. Furthermore, vendors are wary of going the software route, because it makes them dependent on Apple's own hardware and modem-control software for their success, and Apple's history with modem products has been none too stellar.

When it comes right down to it, Duo owners will be the losers. They'll be stuck with Apple's Express Modem, an as-yet-unproven entity. And they will most likely find that the advanced capabilities that third-party-modem vendors are developing for their modem hardware and software will not be made available in software-only versions that run on Apple's Express Modem. Won't it be a shame if the only bright side of this picture turns out to be that, given how quickly Apple is coming out with new CPUs these days, the current Duos are

probably going to be obsolete in a year and no one is going to care about this problem any longer?

There is a bit more of a silver lining than that. To date, one vendor, Global Village, has announced that its GlobalFax software, which ships with its TelePort and PowerPort modems, will be sold separately in a version that works with Apple's Express Modem. (Pricing wasn't set at press time.) And Supra, maker of SupraFax modems, expects to have a Duo modem some time in the second quarter of this year.

Greener Grass

But even if the modem scene is a bit dim in the Duo department, things are hopping for the 100-series PowerBooks (the 100, 140, 145, 160, 170, and 180). Here are some of the highlights:

OCR. PSI was the first company to offer OCR capability — the ability to convert received faxes to editable text — for its internal PowerBook modems, the PowerModem series. PSI ships STF

Technologies' Fax Manager software with the PowerModems; for \$99, users can upgrade to Fax Manager Plus, which provides OCR. By the time you read this, Global Village will also be offering OCR capability. It will be bundled free with the PowerPort and TelePort/Gold modems and sold as an upgrade for the Bronze and Silver models.

Voice. This is one of the hottest areas in modem technology right now. Many vendors are scrambling to provide voice capability in addition to the more common data- and fax-transmission capabilities. Applied Engineering was the first company to provide a voice/data/fax modem, the DataLink PB, which ships with software that can turn your PowerBook into an answering machine as well as a modem and fax machine. Data Race, which is shipping its Apex series of fax modems for PowerBooks, expects to provide voice capability in the second quarter of this year. Bay Connection plans to offer voice support for its Ace modems within the first quarter of this year, and

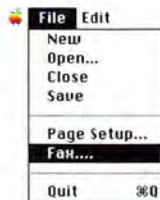
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Supra expects to add voice capability late in the first quarter as well. Several other vendors are also working on voice but weren't willing to commit to shipping dates for publication in this article.

Cellular. As more PowerBooks go on the road, more users are feeling the need to make remote calls from wherever they happen to be. And cellular connections are available from many more locations than are telephone wall jacks. But cellular phone calls tend to fade in and out, as you know. Humans are fairly tolerant of such quirks, but computers and modems are less so. If modems and the software that run them aren't designed to handle the pitfalls of cellular calling, data transmission can be seriously impaired and lines can easily drop. Two companies shipping solutions to this problem are Data Race, whose Apex-series modems are "cellular ready," and Applied Engineering, which in addition to the DataLink PB sells Axcell adapters for connecting the DataLink PB to Oki and NEC cellular phones.

On the Road

The battle has begun for king of the PowerBook-utilities hill. For a while, Connectix's CPU (Connectix PowerBook Utilities) was the only game in town. Now Symantec's Norton Essentials for PowerBook, the long-awaited challenger, is also shipping. (By the way, although Norton Essentials was formerly known as GUM — Guy's Utilities for Macintosh — Symantec would prefer that you refer to its product as *Essentials*, rather than *NEP*.) Both of these utility packages are aimed primarily at solving the No. 1 problem faced by PowerBook users on the move: battery management. By allowing you to tune your system to spin down your PowerBook's hard-disk drive, dim its screen's backlight, and rest its processor, they help you squeeze the maximum working time from your battery's charge.

Now that problem No. 1 has been addressed quite well by these two vendors, some clever software-engineering types are turning their attention to problem

No. 2: connectivity. Perhaps you're familiar with this scenario:

You're at work. You open the Chooser; select Work Horse, your office printer; and merrily print documents all day. Then you disconnect from the network and take your PowerBook home. You connect your PowerBook to your personal laser printer (Home Office), type a few lines, and slide the mouse on up to the Print command. And what do you get? An error message. It reads something like this: "You must be nuts. Work Horse? I never heard o' no printer named Work Horse. Forget it."

So it's back to the Chooser, select Home Office, close the Chooser, and *then* print. You get to repeat this ritual every time you switch to a different network (or connect to a non-network printer).

Then there's the delightful problem of deferred printing. It's next to impossible to do. You'd think that Apple would have come up with a solution to this problem. PowerBook. Mobile computing. Print

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CIRCLE 244 ON READER SERVICE CARD.

Monitor built in to System 7. Seems as if all the pieces are there. But nope. No can do.

After all that buildup, you're expecting me to give you a solution, right? And I wouldn't want to disappoint you.

Palomar Software (619-721-7000) is developing a utility called On the Road (\$99), which should be available by the time you read this. And it does the very things I just complained about not being able to do.



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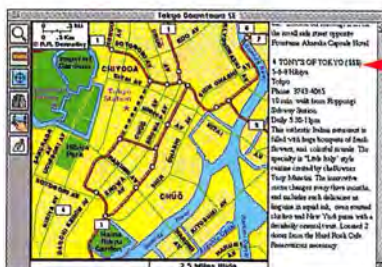
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CIRCLE 187 ON READER SERVICE CARD.

On the Road contains a very smart system extension called Watcher. Watcher's job is to check to see what kind of environment it's in every time you boot your PowerBook or wake it up. Watcher snoops around on your network, looking for zones, servers, and printers; checks to see if you have a phone line connected (in case you want to fax a document or two); and probably looks for a couple of other things that aren't obvious at first glance.

Based on what Watcher sees, On the Road makes an educated guess about where you are and asks you to confirm that guess. (It's a bit tentative when it starts out, but its confidence level improves if you give it positive reinforcement.) Once On the Road knows where you are, it automatically chooses an appropriate printer, mounts user-selected AppleShare volumes, and (if your PowerBook is connected to a phone line) sends previously stored faxes.

Printerless Printing

If you're not connected to a network or phone line but need to send a fax or print a document, On the Road stores your jobs until you are connected and then (depending on how you set up your preferences) either automatically prints them or asks you if you want to print them. It also lets you redirect print jobs. For example, say you're in your office and have Work Horse chosen as your printer. You then leave on a cross-country trip to corporate headquarters on the opposite coast. While in flight, you output several documents for deferred printing. When you get to headquarters and plug in to the network there, On the Road sees that printers are available, but not Work Horse, and asks you which printer you want to redirect your print jobs to. It also provides a menu from which you can, at any time, switch to a different printer.

In addition to handling faxes and printing, On the Road will automatically remount your favorite AppleShare volumes as you move from location to location. This is a more extensive (and more useful) version of a similar feature, Auto-Remounter, that is provided in System 7.1 for PowerBook 160 and 180 and Duo 210 and 230 users.

On the whole, On the Road holds high promise. Check it out.

Henry Bortman is MacUser's technical director.

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No matter what kind of Mac you have, you probably wish it worked faster. Depending on what you use it for, there are several ways to accomplish this: You can add a video accelerator or an accelerator that speeds up a specific application such as Photoshop. For those who just want to add zip to an older machine or generally enhance their Mac's performance, a CPU (central processing unit) accelerator speeds up almost all operations.

To find out what you need to know before shopping for a CPU accelerator, read the following tips. To learn even more about accelerating your Mac, take a look at the following *MacUser* articles: "Blasting Off: CPU Accelerators," June '92, page 166, and "Fast 68040 Accelerators," November '92, page 210.

By Victoria von Biel

How to Buy CPU Accelerators

☑ CPU accelerators are based on the standard processor models (68020, 68030, and 68040). Like the CPU in your Mac, accelerators are also rated by their clock speed, which is described in megahertz (millions of cycles per second). Because the CPU uses the clock to synchronize all of its processing, the clock speed controls how much work can be done in a given time. The higher the clock frequency (50 megahertz is the highest), the faster the clock speed. Some accelerators give you a more powerful CPU, some give you a faster clock speed, some give you both.

☑ Boosting the clock speed is the least expensive way to increase speed, although you can damage the CPU by forcing it to operate at speeds for which it wasn't designed (increasing the chip's frequency also increases its temperature). Accelerators with high clock speeds have heat sinks attached to the main processor to reduce the chip's temperature.

☑ Before you go accelerator-shopping, analyze your work patterns and find out exactly what it is you want to do faster. Complex spreadsheet calculations? Video? Word processing? If you know what you want to speed up, it'll be easier to select the right accelerator, and you won't buy more — or less — speed than you need.

☑ If you do a lot of number crunching, you'll probably need an accelerator that includes an FPU (floating-point unit) chip, also called a math coprocessor. If you don't do mathematical work (or some graphics work, such as rendering — check your application's documentation to see if it makes use of floating-point calculations), you can save around \$200 by buying an accelerator without an FPU chip. You probably won't notice any difference in performance.

☑ Adding an accelerator to your system won't speed up everything. Actions that are not controlled by the CPU (scrolling through a word-processing document, for example) will not

show any speed improvement whatsoever.

☑ If you have a compact Mac (an SE or a Classic, for example), look for an accelerator that includes a video card. That way you'll be able to add an external monitor as well as speed up your Mac.

☑ Make sure the accelerator you select supports your monitor; few support every monitor on the market.

☑ Compatibility problems can crop up between 68040 accelerators and some software (Word 4.0, for example), so make sure you can easily turn off the accelerator (usually in a control panel) when you want to use incompatible programs.

☑ If your accelerator requires that you install RAM on the card, it's a good idea to buy the SIMMs (single in-line memory modules) from the accelerator manufacturer to avoid encountering incompatibilities.

☑ Because NuBus accelerators require RAM SIMMs on the card, they draw more power than PDS (processor-direct slot) accelerator cards do. If your Mac's power supply is less than robust, take this into consideration.

☑ Find out how the accelerator is installed. Some CPU accelerators replace the CPU on your Mac's motherboard; others involve putting a card containing a more powerful CPU into a NuBus slot or a PDS. Installing an accelerator (even one that just clips on) can be a delicate operation, and the consequences can be dire if you mess up. To be safe, have the manufacturer or a dealer install the upgrade. This is especially important for compact Macs.

☑ If your Mac is still under warranty, remember that any permanently installed third-party upgrade will void your warranty. If this is a concern, check out Apple-authorized upgrades. They are often more expensive and may have fewer features than third-party upgrades, but they will leave your warranty intact and selling your Mac later may be easier if it has an Apple rather than a third-party upgrade. Ⓜ

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POWER TOOLS

Laser fare: If you spend too much time hovering over a hot laser printer, *The Flash* may be just the publication you're looking for. Billed as the "premier journal of laser printing," *The Flash* contains articles and quick tips on **perfect printing** as well as illustrated instructions for basic repairs.



The magazine is published quarterly (\$5 per year), and you can get a one-year subscription on-disk for \$29.95.

The editors recently compiled the best material from the past four years into *The Flash Compendium* — a bargain at \$12.95. 802-439-6462.

Go figure: You couldn't pick a better year to go shopping for an accounting package for your company, no matter how big or small it is. Great Plains is now shipping Dynamics, a modular, graphical accounting system that can be used across a network. With the Dexterity development language — which lets third parties add customized modules to the system — Dynamics is an extremely powerful package for companies that need **cross-platform accounting**. Depending on the modules you buy, prices start at around \$3,000. 800-456-0025 or 701-281-0550. ♦ Another high-end product comes from RealWorld, long a force in accounting on the PC side, in the form of its Visual Accounting system. General Ledger and Report Writer modules should be available now, with Accounts Receivable and Accounts Payable coming later this year. Prices start at \$795. 800-678-6336 or 603-224-2200.

No foam, please: We were hoping it would fix us a nice nonfat, decaf latte right at our desks, but instead Disk Café, from Bering, turns out to be

a collection of SCSI-drive utilities in the tradition of FWB's Hard Disk ToolKit and Casa Blanca Works'



Drive7. Disk Café's oddly named modules — **Cappuccino, Disk Café, and Kitchen** — let you mount new drives without restarting your Mac, display SCSI-device information, format and verify removable cartridges and hard disks, create partitions, and test your media and drive. (Cappuccino is a commercial version of the SCSI-Probe-like shareware utility Espresso.) \$59. 408-364-2233.

Face-lifts: Version 2.0 of the backup utility Retrospect, from Dantz Development, should now be available, and its new features are bound to make the utility program even more popular. Retrospect 2.0 boasts an overhauled interface, an easier-to-use scheduler, the ability to preview backup scenarios, and customizable selection criteria. **It's also faster**, and Dantz claims that it works with just about any tape drive currently available. About the only thing that isn't new is the price, which stays at \$249. 510-849-0293. ♦ Backing up is a basic safeguard, and so is protecting



your Mac from viruses. SAM (Symantec AntiVirus for Macintosh) is now out in version 3.5, which adds the ability to scan compressed files, schedule scans, and install the program over a network. \$99. 800-441-7234 or 408-252-3570.

♦ If you dislike your Mac's desktop pattern, check out Chameleon, a module in Version 2.5 of Logical Solutions' 7th Heaven. With its new and improved color editor and pattern selection, you're bound to find something groovy. The FinderExpress module has also been upgraded to make copying files even faster, and the whole package is now System 7.1-compatible. \$99.95. 612-659-2495. ✎

By Victoria von Biel

Managing Mystery Files

*Just what are all those weird files cluttering up your hard disk?
WordTemp? Installer Cleanup? Certainly, you didn't put them there
... or did you? Here's how to get rid of the residue
without losing valuable files.*

By Christopher Breen

Browsing through your Mac's System Folder (and some application folders) can be a daunting experience. You'll come across plenty of files that have a recognizable purpose — System, Finder, Scrapbook, and so on — but there are just as many that look as if they *might* be important, if only you knew what they were and why they were there. Most of the time these files have a perfectly good reason for existing, but some

are both mysterious *and* useless. Here we present some of the most notorious such files — the kind that stop you in your tracks uttering the oft-heard phrase, "What the heck is that?"

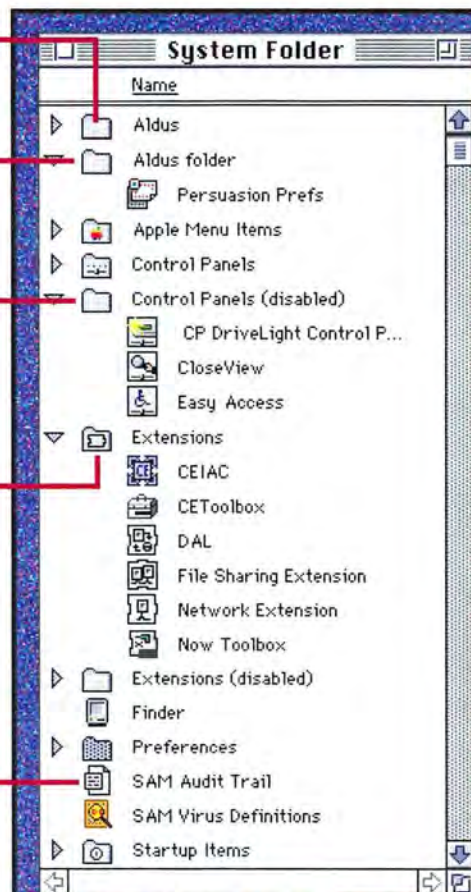
It's reasonably safe to bet that if you didn't intentionally put it there, your mystery file is a temporary-item file, installer file, preferences file, log file, or system file (as shown in the illustration below). Although System 7 brought a modicum of order to

Application-specific folders. Unlike other applications that throw their preferences files into the Preferences folder, Aldus prefers to keep its preferences and utility files for PageMaker, PrePrint, and FreeHand inside a folder named Aldus. Persuasion elects to place *its* preferences files into the folder called Aldus folder.

Disabled programs. Extension-managing programs such as Now Utilities' Startup Manager, Casady and Greene's Conflict Catcher, Apple's Extensions Manager, and Inline Design's InitPicker create folders with the *(disabled)* label, which contain control panels, startup items, and extensions you have turned off, using the extension manager.

Extensions. Extensions are files that add new functions to the system. Under System 7, extensions are automatically placed in the Extensions folder if you drag them into the System Folder. Extensions that you've turned off using an extensions manager are placed in the Extensions (disabled) folder. Throw out a disabled extension only if you're absolutely sure you don't need it. Some extensions (CEToolbox, for example) must be installed for certain programs to run properly. Other extensions, such as the Network, File Sharing, and DAL extensions, may be trashed if you don't use the functions they support.

Log files. Files such as Symantec's SAM Audit Trail are text documents that provide a record of activities undertaken by the application. Most applications let you suppress the generation of these files.



the placement of these files by automatically putting certain files (extensions and control panels, for example) into specific folders, it's not always easy to tell the difference between the necessary and the superfluous. Roll up for the Macintosh mystery tour, as we shine the harsh light of truth on these files and expose them for what they are.

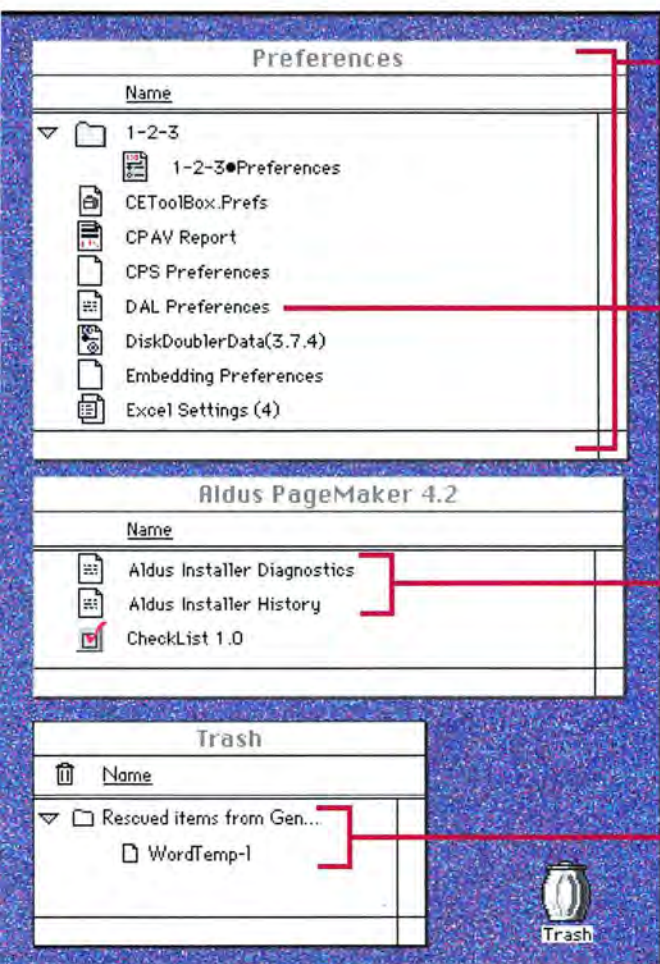
Temporary Files

If you're a System 7 user whose system is prone to crashing, you may have noticed that your Trash sometimes takes on an unsightly bulge when you restart. The extra girth is caused by a folder labeled "Rescued Items from (your hard drive's name here)." Temporary-item files are stored in this folder.

Temporary-item files contain data from files that were open at the time of a crash and ostensibly serve to protect documents from application and system crashes. In earlier days, these files — Microsoft Word's WordTemp files being the most notorious — were individually scattered about in your System Folder, where they would stay until you tossed them out. Apple has recently brought some order to the temporary-items universe by introducing a set of standards for creating and storing these files. If they are written to Apple's standards, applications that produce temporary files also create an invisible Temporary

Items folder at the root level of your startup volume. Each time you open a document, the application places a new temporary file (often given the name of the application followed by a letter or number, or in the case of both WordPerfect and Symantec's MORE, a long series of randomly generated numbers) in the Temporary Items folder. As you close each document, the application removes its temporary counterpart. In the event of a crash, System 6 users will find their temporary buddies in the now-visible Temporary Items folder. System 7 users who crash will find a folder in their Trash called "Rescued Items from (volume name)."

Although temporary files rarely contain usable data, you can attempt to recover what data there is by removing the Rescued Items folder from the Trash before you launch the appropriate application (some applications, such as Microsoft Word 5, dispose of the Rescued Items folder on launch). System 6 users should pull the files from the Temporary Items folder at the root level of their startup drive. If the icon of the temporary file matches the icon of the document it replaces, you can open it in the usual double-click manner. Temporary files with generic document icons must be opened from within the application. If these files refuse to open, they may have lost their type and creator information; in such a case, you can use ResEdit or a



Preferences. The Preferences folder holds files containing user-defined or program-default settings for your applications. If an application follows Apple's guidelines, you can safely discard its preferences file, secure in the knowledge that another will be created for you based on the default settings assigned by the manufacturer.

DAL. The DAL (Data Access Language) extension and related files, such as this preferences file, are automatically installed, but you need them only if you access a main-frame database. If that's not the case, go ahead and trash the preferences file and the DAL extension.

Installer files. These files contain a blow-by-blow account of an application's installation process. Generally considered dull reading, they can be trashed.

Temporary files. A bulging Trash on restart sometimes indicates the presence of a Temporary-item file. In their wisdom, the folks at Apple have placed these mostly useless files in the Trash. Move them to a safer place if you'd like to try to recover data; otherwise, dispose of them by emptying the Trash.

similar file-editing utility to add the appropriate information. As a last resort, you can employ a utility such as MacTools' DiskEdit or Norton Utilities' Disk Editor to recover any readable text.

Data in some Rescued Items files isn't as hard to recover. For instance, when you open a *copy* of a document (not the original), PageMaker 4.2 creates a temporary file called ALDTMP01. This file is continuously updated to reflect unsaved changes. If your computer crashes during the initial save of the copy, you can use the ALDTMP01 to recover your document — complete with the changes up to the point of the save. If you crash before you save, this somewhat redundant file holds information only as current as the original. Once you've successfully saved the original file, its temporary counterpart is deleted.

As you work on a document that's been compressed with Alysis' More Disk Space or SuperDisk!, these applications write your changes to a temporary file called SuperDisk!TempfileA (or B, C, and so on, depending on the number of open files). Once you have saved and closed the document, More Disk Space and SuperDisk! update your original file and delete the temporary file. If your computer crashes after a save but before you close the files, you'll find the updated documents in the Rescued Items folder in the Trash. In response to the criticism that ill-informed users won't know to dig in their Trash for updated files, Alysis released a free control panel called Safety Belt. On restart, Safety Belt alerts you to the presence of rescued items and offers advice on their recovery.

In addition to the garden-variety temporary files on your hard disk, you may stumble upon installer temporary files. For example, if your Mac crashes while you're running the Word 5 installer, a folder labeled Installer Temp or MSWord may appear on restart. To remove these Microsoft files, you must run Disk First Aid (the disk-repair utility that comes with system software), repair the disk where these temporary folders reside, and then toss them out. In contrast, you can trash temporary files created by WordPerfect's installer without repairing your disk.

Apple's System 7 Tune-Up Installer also creates temporary installer files. During a *live* installation (meaning that you are updating a previously installed system), the installer protects your data by creating a copy of the system, which is

disposed of when you restart. If you crash during installation, you will find one or more Installer Temp folders and the Installer Cleanup extension in your System Folder. Go ahead and delete these files and folders.

Installer Files

Nothing junks up a disk as much as clicking on the Easy Install button when you're loading new software onto a hard disk. The temptation to follow this path can be overwhelming, but if you succumb, you often find yourself with drivers for printers and modems you've never heard of, filters for obscure programs, color

Nothing junks up a disk as much as clicking on Easy Install when you're loading new software. You find yourself with drivers for printers and modems you've never heard of and yet another copy of TeachText.

resources on your Mac Classic, and yet another copy of TeachText.

Many manufacturers now provide installers that include a customizing option that lets you install only those parts of the program that you need. For instance, if you choose the WordPerfect installer's Customize option, WordPerfect 2.1 lets you exclude tutorial documents and specify the amount of RAM allocated to the application. Other applications, such as QuarkXPress, Photoshop, and Illustrator, install only their basic software. If you want the tutorial and utility files for these programs, you must manually drag them to your disk. On the restrictive side, because Lotus 1-2-3 has no installer and the program files are in a compressed form on the floppy disks, every tutorial and conversion file is installed automatically when you decompress the program.

If this article arrived too late to prevent you from heedlessly clicking on every Easy Install button you see, you'll have to manually weed out unneeded files. Beyond checking your applications' manuals to see which files are extraneous to your system, the safest way to clean out

unnecessary files is to create a folder, move any questionable files into it, and see how your applications run without them. If your applications continue to work just fine, you can trash those files. Indiscriminately installed printer drivers and description files are some of the biggest consumers of disk real estate. Unless you use a particular printer or intend to create a PostScript file for a specific device, installing these incidental files is a waste of time and space; go ahead and search out and destroy them.

In addition to installing printer drivers and program filters, some installers install *themselves*. For example, in Persuasion the Aldus Installer/Utility deposits a copy of itself in a folder named Aldus folder. In FreeHand, PageMaker, and PrePrint you'll find the copy in a folder named Aldus. Go ahead and trash this application — unless you want to have easy access to its diagnostic powers, in which case you should keep one copy on your hard disk.

Preferences Files

Apple made an effort with System 7 to spruce up some of the Mac's housekeeping routines. In addition to the new temporary-items guidelines, Apple pronounced that all preferences files would, from that day forward, be placed in the Preferences folder within the System Folder. These files contain user-defined settings; although you won't irreparably damage your hard disk by trashing them — Apple's Preferences guidelines ask that applications be able to operate without a preferences file — all your personal settings will disappear and be replaced by the program's defaults. With applications such as Studio/32 that contain few preferences options, this is not a hardship. On the flip side, if you use Dantz's Retrospect for backups and toss its preferences file (called Retro.Prep), you lose not only your preferences but also your script, log, and source and archive information.

Even though Apple has issued the word from on high, some applications don't place preferences files in the expected folder. The QuarkXPress installer, for instance, tosses all installed items into the application's folder. For the sake of tidiness, you can drag the preferences file directly into the Preferences folder. Adobe has not yet set a standard for installing its preferences files. Photoshop instructs you to create the PS Prefs file and then choose its home. If you later move the PS Prefs

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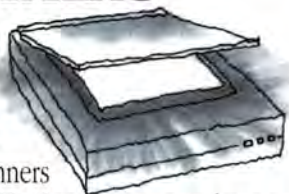
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POWER TOOLS TECHNIQUES

file, Photoshop will ask you to locate it the next time you launch the program. Illustrator, on the other hand, puts its preferences file in the application's folder and won't recognize it if you place it in any other folder. Deneba's Canvas exhibits more flexibility: Although it also places its preferences file in the application's folder, Canvas allows you to move it, delete it, or create multiple Canvas Prefs files that serve as templates for a variety of documents.

Unlike preferences files, some accessory files automatically installed or created by a program are not disposable. Some applications require resource files you cannot trash, move, or modify if you want the application to run. Pity the poor PageMaker user who unsuspectingly expunges PM4.2 RSRC or the musician who puts his Vision or Performer Resources file to rest. The rule of thumb is, before you trash a file you're not sure of, move it to a folder outside the System Folder and then refer to the manual and make sure it's not vital.

If you intend to manually place files into the Preferences folder, bear in mind that unlike control panels and extensions, preferences files are not automatically placed in the Preferences folder when you drag them onto your System Folder icon: You must go through the additional step of putting them there yourself.

Log Files

Several programs create visible log files in the System Folder. Log files are automatically generated text documents that detail the results of diagnostic tests or provide a blow-by-blow description of an installation. If you use any of Aldus' products, you've probably run into the Installer Diagnostics and Installer History files. Other common log files are Symantec AntiVirus for Macintosh's SAM Audit Trail and the InitPicker Log, created by Inline Design's InitPicker extension manager. Unless you're fascinated by minutiae or suspect that a company's tech-support staff will demand information contained in these reports, you can unhesitatingly trash them.

More vital to your Mac's well-being are the invisible log files that belong to applications that work in the background. Automatic optimizers and file-saving programs maintain these files at the root level of your hard disk and update them as you make changes. Norton Utilities' FileSaver and Central Point's MacTools Mirror

modules each place invisible log files on each protected volume. These files — MacTools' Critical VolInfo and Delete Tracking and Norton's FileSaver Data, VolumeSaver Data, and VolumeSaver Index — help you recover damaged or accidentally deleted documents. DiskExpress II, the optimizing module of

Some applications require resource files you cannot trash, move, or modify if you want the application to run. Pity the poor PageMaker user who unsuspectingly expunges PM4.2 RSRC.

ALSoft's Power Utilities, also keeps its invisible log file — named Disk Express Activity Log — at the root level of each monitored volume. This log file is a record of your disk activity over a five-day period and is used to determine where DiskExpress II places your least- and most-used data.

Software companies make files such as these invisible in order to protect the information they contain. Although you can use programs such as CE Software's DiskTop to make these files visible so you can toss them into the Trash, it's better to leave them untouched.

System Files

As smart as the System 7 installer may be, you can easily do without certain automatically installed components. Take the Data Access Manager. New to System 7, this interface allows the Mac to communicate with a remote computer's database. Its DAL (Data Access Language) extension is required by applications that communicate with a DAL server (usually a mainframe) through the Data Access Manager. If you're not one of the very few Mac users who needs DAL and its preferences file, toss them and save yourself the 63K.

If you work alone and have no need for the networking options built in to System 7, go ahead and trash the File Sharing Monitor, Sharing Setup, and Users & Groups control panels as well as the AppleShare, File Sharing, and Network

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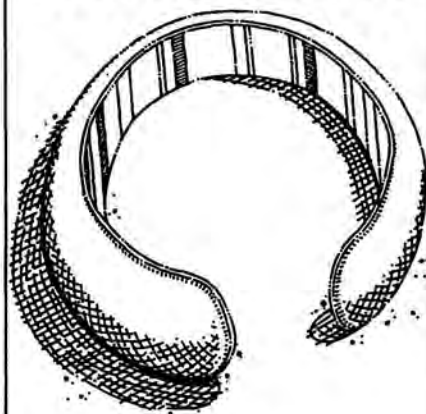
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extensions. If your printer doesn't support background printing, you can also dispose of the PrintMonitor extension.

If you're on a network, you may have run across an invisible folder called *Move&Rename*. This folder is created when you turn on File Sharing in the Sharing Setup control panel. As the name implies, the folder comes into play when remote users move or rename files or folders on your drive. *Move&Rename* will be re-created if you trash the folder.

Apple makes some provisions for users who are physically impaired. Oddly, one of the two utilities targeted for this group (Easy Access) installs automatically; the other (CloseView) is optional. Easy Access is intended for people who have difficulty with two-handed typing or moving the mouse. If you don't need it, trash it.

But Wait, There's More

In a perfect world, all of your mystery files would fit into one of the previous categories. Regrettably, this isn't so. Certain background processes create files and folders that can baffle even the most seasoned Mac veterans.

For example, the utility Last Resort — Working Software's keystroke saver — protects documents from the perils of a system or application crash. Unfortunately, Last Resort users often overlook the ever-expanding record of data that's accumulating on their hard disks. The Last Resort folder (found in the Preferences folder) does not automatically flush old files, and your disk will bloat until you toss out this keystroke-record file, which probably contains outdated information anyway. Users of Now Utilities' NowSave module will have the same problem if they enable Key Capture but fail to check Auto-Delete in the Key Capture Options dialog box.

Another handy program, HAM — Microseeds' hierarchical-menus utility — gives users the option to create a Recent Items folder on their Apple menu. This folder contains aliases of recently used applications, documents, and folders. HAMsters beware: Using the Find command to locate an item on your disk that is also aliased in the Recent Items folder will add at least one entry to the list in the Recent Items folder (as many as three, if an application, document, and folder all have the same name). Disable the Recent Items option (you'll find it on the HAM Control Panel) to avoid confusion.

If you use an extension-manager program such as Now Utilities' Startup Manager, you'll find folders labeled Control Panels, Extensions, Startup Items, and System Extensions followed by the parenthetical suffix (*disabled*) in your System Folder. These folders contain all those little startup programs you have deemed unworthy for your current setup. If you trash the folders, you also lose all the goodies they contain.

Highest on the list of programs most of us would like never to see again is TeachText. All developers, whether of commercial software, shareware, or freeware, chuck this little devil onto their disks, as if the one copy we received with our system software weren't enough. If you're patient, you can issue the Find command and trash each copy (except the one in your System Folder) as it appears. A more expedient route is to acquire Bill Monk's free Find Pro II (available from MacUser's on-line service ZiffNet/Mac as well as user groups), track down all redundant instances of TeachText, and delete them in one fell swoop.

CE Software supplies one of the more mysterious items on the Apple Menu. CEToolbox is an extension that allows applications such as CE's QuicKeys and DiskTop to communicate with your Mac. Without CEToolbox, you won't be able to launch applications from DiskTop, and QuicKeys will simply disappear from the menu. QuicKeys users also have the option of installing DialogKeys and CEIAC. The DialogKeys utility lets you substitute keyboard strokes for mouse clicks when you press on-screen buttons. CEIAC is an extension that enables Apple events, Finder events, and UserLand Frontier to communicate with QuicKeys. Now Utilities 4.0 also has a toolbox extension (called Now Toolbox) that is necessary for most of Now Utilities' modules to run properly. If you disable it, you'll be able to use only Now Profile and Now Scrapbook.

System 7 sets a standard for organizing perplexing files. As more software publishers follow Apple's guidelines, the thick clouds of confusion should begin to dissipate. Until then, you can — now that you know where to look — make an informed decision about whether to bung the offending files into the Trash or simply to take a deep breath, continue working, and mutter "What the heck is *that*?"

Christopher Green is a writer and musician who lives in the San Francisco Bay Area.

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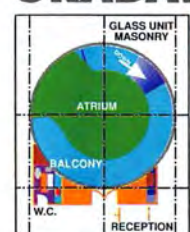
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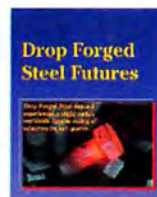
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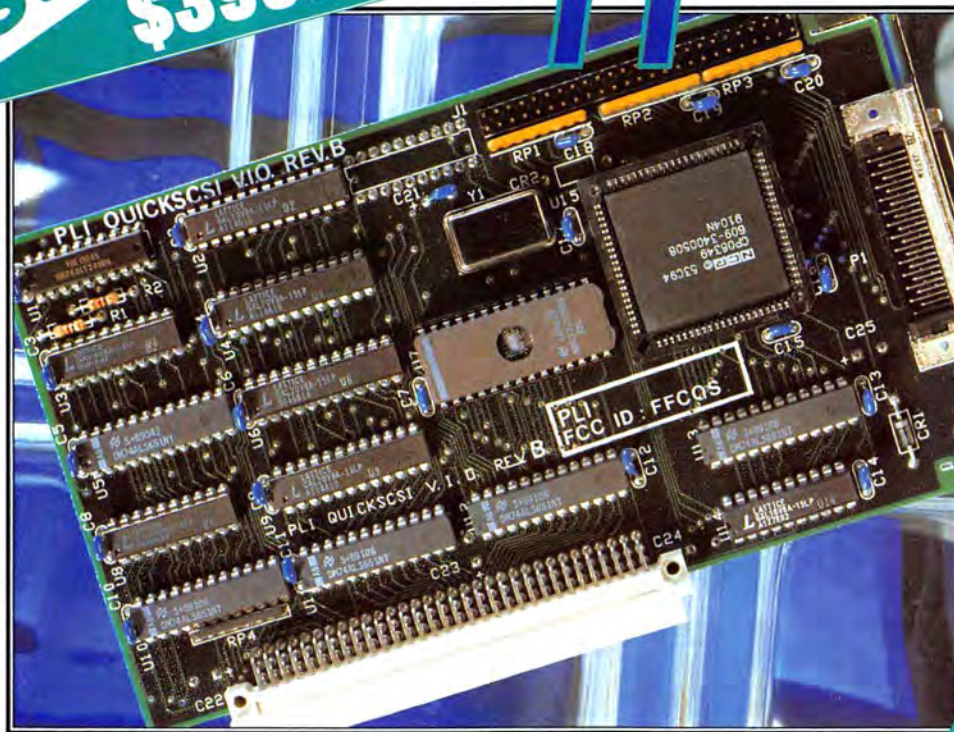
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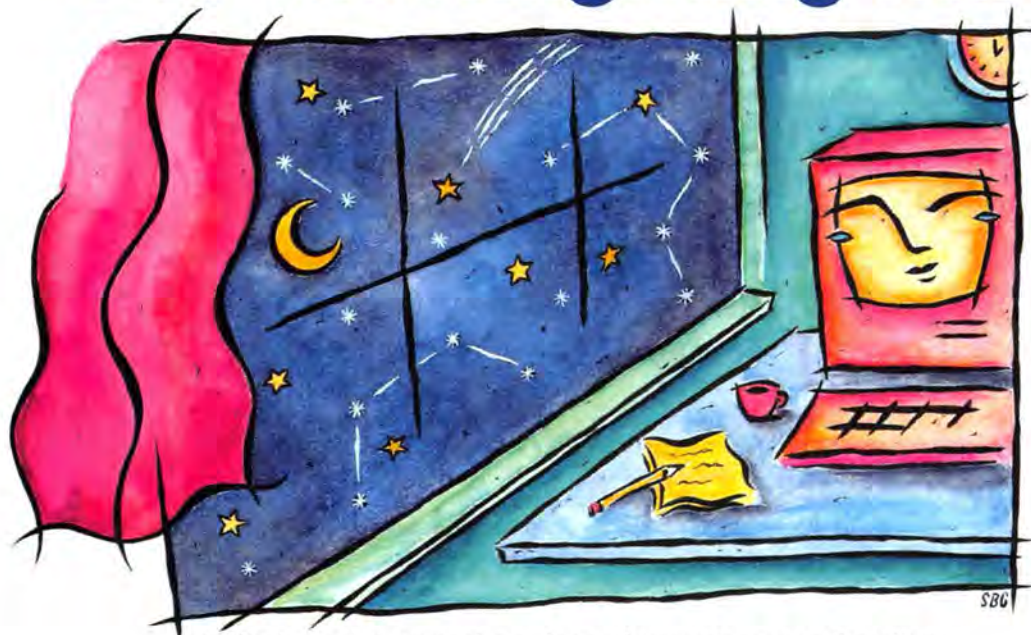
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The Moonlighting Mac



A Mac's work is never done. Even when you're not in the office, your Mac can still be working hard — backing up data, compressing files, downloading E-mail, and more.

By Adam C. Engst

If all your Mac does when you're not using it is display a screen saver, it's time to start thinking about better ways to use your Mac's free time. Assuming that you leave your Mac running while you're attending meetings or are at lunch or even when you leave the office at night, there are plenty of tasks — ranging from backing up your data to retrieving information from an on-line service — that are so tedious and time-consuming that they're best done when you're not around.

Don't worry that leaving your Mac on will harm it or waste electricity. I've never seen conclusive studies that show whether it's better or worse for equipment to stay on, so I play it safe by leaving my CPU and hard drives on, turning off my 13-inch color monitor, and letting the After Dark screen saver protect my SE/30's built-in monitor. My electricity bills have been no higher since I started doing this, and I have yet to notice any resulting problems with my Mac or hard drives.

Mac Traffic Controller

Before you start automating tasks on your computer, there's one problem you need to solve: Because most programs run faster and more efficiently in the foreground (that is, when no other applications are running), you need some way of launching and then quitting programs while you're not around. The easiest way to do this is with a macro program such as CE Software's QuicKeys or Affinity Microsystem's Tempo II

Plus. (Just make sure the program lets you schedule when a macro will run — an essential feature for unattended operation.) A macro program lets you record a sequence of actions and then assign a key combination to the sequence. Any time you press the key combination, the sequence is replayed. At first, creating your own macros takes some thought, but CE has simplified the process with Instant QuicKeys (there's an enhanced version of Instant QuicKeys in version 2.1.3 of the QuicKeys package), a program that walks you through the whole macro-creation process. Once you're familiar with Instant QuicKeys, creating and recording more-complex macros is fairly easy.

If a macro program is just too basic for you, you can take a large step up to a scripting program, such as UserLand's Frontier, which lets you write miniprograms. Frontier also automates many tasks, and it's much more powerful and complex than QuicKeys, because you can use it to write short programs that control both the Mac's operating system and Apple-event-aware applications. However, tasks such as responding to dialog boxes confound Frontier, so this program cannot completely replace QuicKeys.

Electronic Mail

If you use an on-line service such as CompuServe or America Online, you're an ideal candidate for automation. Reading and writing electronic mail (E-mail) on-line is tedious and

BEATING THE SYSTEM

expensive. By automating the downloading and uploading tasks, you can set things up so that your Mac can log on at night when rates are cheaper and remote machines are faster.

The granddaddy of graphical-user-interface automated Mac communications programs is CompuServe Navigator. It can perform almost any task on CompuServe (or on MacUser's on-line service, ZiffNet/Mac), from downloading E-mail and files to capturing message threads.

If accessing CompuServe is the only task you want to automate, you can leave Navigator running in the foreground and use its Run at Time command to have the program automatically log on to CompuServe at the time you specify. Navigator saves the session file when it's done and then quits or shuts down.

If you want to integrate Navigator with other automated programs, remember these tips: First, have Navigator run in the foreground, or it will run slowly, racking up telephone charges. Second, make sure your macro or scripting program selects Do Everything or the appropriate task from the Navigator's Tasks menu. Third, set Navigator's preferences to Always Append the Session or Always Replace the Session, whichever you prefer. For optimum session speed, when you set Navigator's preferences, set them to automatically save the session file and to stay at the session start.

Although it has fewer automation features than Navigator, America Online 2.0 can automate E-mail and file downloads with FlashSessions. Select FlashSessions from the Go To menu, choose the tasks to automate, schedule the times and days you want to run the session, and store your password — and you're done. The America Online application must be running for FlashSessions to work, so leave it running or launch it with QuicKeys before your scheduled FlashSession. Version 2.0 of the America Online software adds the Download Manager, which lets you mark files for downloading later during your automated FlashSession.

Users who want to automate connection to and use of the Internet can use ICE Engineering's uAccess to perform several of what the company calls "background tasks." Chief among the tasks are timed calls to other machines to transfer mail and news, using the UUCP (UNIX-to-UNIX Copy) protocol.

Communications programs seldom

coexist happily, so if you plan to automate more than one (such as Navigator and America Online), make sure that you give each program sufficient time to transfer E-mail and download large files. Otherwise, if one program is downloading and another program kicks in, at best the second program will fail and at worst

I once ran CE Software's QuickMail at night, and the faint beep that signified incoming mail gave my wife nightmares.

the first program's download will be ruined as well. Some programs, such as Software Ventures' MicroPhone II, hog the serial port, so be sure your system quits the piggy program before it runs another.

Backup

Wouldn't it be nice if electronic elves backed up your Mac every night? That might not be possible, but if you have a large storage device, such as a tape drive, for backups, you can automate many backup programs so that your data is backed up during the night or while you're out at lunch.

You may not even need QuicKeys to automate backups, because many backup programs — including Norton Backup, from Symantec's Norton Utilities 2.0; CP Backup, from Central Point Software's MacTools 2.0; and Dantz Development's DiskFit Pro 1.1 and Retrospect 2.0 — include extensions that can schedule and perform automatic backups.

For instance, Dantz's high-end program Retrospect 2.0 includes an extension that launches the program prior to an unattended session. You configure the unattended sessions, for either backing up or restoring files, in Retrospect's internal calendar. Retrospect can quit or shut down upon completion, leaving nothing behind except a set of backed-up files and a log of its actions.

Compression

If you automate your backups, you often have to buy a bigger backup device (a tape drive, for example), because even QuicKeys can't insert a floppy at 1:30

A.M. However, you can extend the capacity of your storage device by using idle-time compression, which lets you fit more files on your hard disk and backup medium, thus delaying the need for new hardware. Utilities that perform idle-time compression (compressing files while you're not using your Mac) include AutoDoubler, from Fifth Generation Systems; StuffIt SpaceSaver, from Aladdin Systems; and More Disk Space, from Alysia.

All three compression programs work in more or less the same way. AutoDoubler, for example, starts compressing files after a user-specified amount of idle time has elapsed. It compresses a file as a temporary file, double-checks the temporary file for safety, and then replaces the porky original file with its svelte new version. AutoDoubler realizes when another program is using the serial port, so it doesn't conflict with automated communications programs. StuffIt SpaceSaver and More Disk Space don't pay attention to the serial port.

Housekeeping

Life is messy — we can't avoid that — but there are ways you can get your Mac to clean up after itself. If you have lots of files scattered around on your desktop or buried many folders deep where you'll never find them, there are a couple of programs that can automate routine cleanup and help organize your hard disk. Magnet, from No Hands Software, creates special files called magnets that attract files with matching criteria. For example, America Online places downloaded files in a folder called Online Downloads. A magnet on my desktop could move all the files from the Online Downloads folder to the desktop for perusal. Magnets can run at specific times, but the Magnet program must be running for the magnets to work. You can use QuicKeys to launch and then quit Magnet so that you don't have to have Magnet running all the time.

The scripting program UserLand Frontier performs more-sophisticated hard-disk housekeeping. To help with automation, Frontier includes what UserLand calls agents (they're called daemons in the darker and more mysterious UNIX world). Think of agents as young, clean-cut, mindless automatons that sit quietly until a certain time, at which point they spring into ruthlessly efficient action and run your scripts. As with Magnet, you

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BEATING THE SYSTEM

must leave Frontier (or the shareware Frontier Runtime) running or have QuickKeys start it.

Although its powerful scripting language makes Frontier more difficult to use than Magnet, Frontier can do more than Magnet. For example, instead of simply pulling the files in that Online Downloads folder out to your desktop, Frontier could use Apple events to launch Aladdin's StuffIt Deluxe 3.0 and have it expand any compressed files, copy the expanded files to your desktop, and put the original archives into the Trash or another folder. If your Mac's desktop resembles mine, you can put an agent to good use copying all the files you leave out every day to a special date-stamped folder.

MacTools 2.0 comes with an extension called CP Scheduler, which can schedule CP DiskFix to automatically scan your hard disk for damage and optionally repair it. Public Utilities, from Fifth Generation Systems, has a similar feature called Prevention, which scans your hard disk when it's idle and notifies you if there are any problems.

Troubleshooting

Even the best-laid macros of mice and men sometimes go awry — or so you're informed, in cryptic Mac dialect, one morning when you arrive at the office. To avoid problems with automated tasking, you need to spend some time testing each QuickKeys macro or Frontier agent. You can do so either by setting the macros or other functions to run at a time when you'll be present or by opening the QuickKeys Quick Reference Card and clicking on a macro, letting it run, and then trying the next one. Similarly, set the start times of your communications and backup programs to daylight hours and then watch your programs execute. If they run with no problems, you can set everything back to run during the wee hours. Be especially careful to test-run automated communications programs that might leave you connected to a commercial service all night and run up a massive bill.

Furthermore, parts of the Mac environment, such as your favorite obnoxious beep, may need disabling at night if you have a sound-activated security system or a home business. I once ran CE Software's QuickMail at night, and the faint beep that signified incoming mail gave my wife nightmares about getting

unpleasant E-mail at her unpleasant job.

If you're careful and test everything first, you should have no problems with using automated-communications software. My Mac has worked hard every night for the past three years, and apart

from the occasional quirky problem, it has worked flawlessly. ☐

Adam C. Engst is the editor of the free weekly electronic newsletter TidBITS. You can contact him via E-mail on CompuServe at 72511,306.

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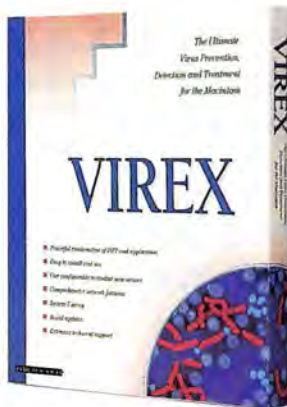
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Because the original LC provided low-cost color for businesses, classrooms, and homes, it quickly became one of the most popular Mac models. But it isn't exactly powerful. If you want to upgrade your LC, you have plenty of options, ranging from Apple's pricey LC-to-LC-II-logic-board upgrade (\$719) to buying an LC II 4/40 (\$1,239), LC II 4/80 (\$1,349), or Performa 400 to adding a third-party LC expansion chassis. More than two dozen manufacturers are making LC upgrades: The trick is figuring out which option makes the most sense for you.

By Bob Brant

Upgrading the Mac LC

The original 16-megahertz, 68020-based LC included 2 megabytes of RAM soldered onto the logic board, two SIMM sockets, and an option to add a second floppy drive inside the case. Compare that with the 16-megahertz, 68030-based LC II and Performa 400, each of which includes 4 megabytes of RAM and two SIMM sockets but no option for a second internal floppy drive — a living testament to the voracious memory and CPU needs of System 7 and today's larger applications. So step 1 in your upgrade plan is to add **more memory** — to bring your LC up to at least 4 megabytes. Prices for 1-megabyte SIMMs start at around \$30; 4-megabyte SIMMs start at around \$120.

A **higher-capacity hard drive** lets you store more data and get to it faster. Prices for Quantum's fast LPS 105 and 240 models start at around \$350. Each of these low-profile (1 inch high) 3.5-inch drives features a 10-millisecond access time and snap-in installation — an upgrade takes less than ten minutes.

Higher speed is always better. LC owners have the choice of FPU (floating-point unit), 68030, and 68040 **accelerators**. DayStar Digital's PowerMath LC card adds 68882 FPU performance to the LC, LC II, or Performa 400 for less than \$130. The company's Equalizer LC gives LC owners a 68030 chip and access to System 7's virtual-memory features for less

than \$280 (including an FPU chip) — a substantial savings over Apple's LC II board-swap upgrade route, which costs \$719 *without* the FPU chip. Applied Engineering, DayStar Digital, and Total Systems offer 68030 accelerators (with and without a 68882 FPU) starting at around \$650. Fusion Data and Total Systems offer 25-megahertz 68040 accelerators starting at less than \$1,300.

A **larger color monitor** lets you put more information onto a larger screen area and get to it faster. Apple's 512K VRAM (video RAM) SIMM upgrades you to 32,768 colors on Apple's 12-inch monitor or 256 colors on the Apple 13-inch color monitor. For those who can afford to dedicate a slot to video, Lapis offers 8-, 16-, and 24-bit plug-in LC color cards starting at \$399. A good companion for your LC is the 15-inch Radius Color Pivot LE, which costs less than \$900 for both the monitor and the card. Figure on paying \$1,000 and up for a quality 16-inch or larger color monitor.





Two vendors offer LC **expansion options** that don't alter the machine's footprint. For around \$350, DGR's Max chassis packs in another power supply, has room for a second hard drive, and adds three PDS slots. For less than \$549, Sonnet's TwinSlot LC accommodates a larger power supply, a half-height 3.5-inch hard drive, and two PDS slots. 

Table 1: Recommended Upgrades for the Mac LC

Upgrade	 Pros	 Cons	 Cost
More RAM	Virtual memory. RAM disk.		\$60 and up
Higher-capacity hard drive	Speed. Storage. Can use with other Macs.		\$350 and up
33-MHz 68030 accelerator	Faster.	Can be costly.	\$650 and up
Color monitor and card	More colors. Faster video.	Costly.	\$900 and up
Expansion chassis	Adds more slots and options.	Depending on cost, may be better to buy new Mac.	\$350 and up
Total upgrade price			\$2,310
List price of new LC II upgrade			\$719
List price of new LC II 4/40			\$1,239

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Nobody ever said you had to live in Cupertino to be a Macintosh expert. Know-it-alls are everywhere, from Manhattan to Malibu — even in Waldport, Oregon, where we found our own Mac guru, Philip Russell. Each month Phil shares his own tips plus the best of the 70-odd Macintosh-user-group (MUG) magazines he reads each month. But Phil can't do it alone. To those whose undocumented Mac tip *MacUser* prints, we pay \$25, and the Reader Tip of the Month earns \$100.

 Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. You can also contribute tips electronically via ZiffNet/Mac, the on-line service for *MacUser*. Send them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

By Philip Russell

Reader tips compiled by Gregory Wasson

■ The first question at least one software company's technical-support representatives ask callers is, "Do you have Find File?" The reason they ask is that too many Mac owners have managed to place more than one System Folder on their hard disks. Multiple System Folders are almost sure to cause problems. If you have Find File (or a similar utility), you can use it to hunt for the words *System*, *Finder*, or both and then trash the extraneous files.

You get extra copies of the System Folder when you dump the entire contents of a new application onto your hard disk without checking to see if a System Folder is included on the floppies.

■ Using keyboard command equivalents is like adding RAM to your Mac, only cheaper, because they let you work much faster. If you find it hard to learn the shortcuts, I recommend the following method: When you go to a menu, check for a keyboard equivalent. If there is one, *do not* make the menu selection from the menu; use the keyboard equivalent. Once you've done this a few dozen times, you'll start remembering the important ones. If you're new to the Mac, learn the following shortcuts immediately: Command-N (creates a new folder in the Finder, a new file within applications), Command-Z (undo), Command-X (cut), Command-C (copy), and Command-V (paste). Apple put those shortcuts close to the Command key because they are so handy to use.

■ You've got a label that's stuck in your ImageWriter? Try this: Get a playing card (I've found that the queen of spades works best), and roll it into the ImageWriter just as you would a sheet of paper. You'll find that the card is often all that's needed to push the label out. (Thanks, Apple Core of Memphis, Tennessee.)

■ If you use a lot of special characters that require use of the Option and Shift keys, place the Key Caps DA at the bottom of your screen and size your document so that the two windows don't overlap. Then you have constant access to Key Caps until you choose to close it.

■ Name your text styles with a number and then a name, such as 1Headline, 2Subhead, 3Byline, 4BodyText, and so on so they're easier to find in the pop-up Style dialog box or window.

■ Pressing the Tab key lets you navigate through the options in most dialog boxes, such as the Print dialog box, without having to grab the mouse for each entry.

■ In PageMaker screen redraws take longer on facing pages than on single pages. If screen redraws are a problem for you, use facing pages only when you really need them.

On the subject of screen redraws, if you set greeking to a smaller font size, screen redraws will be speedier. But then, of course, you have to enlarge the view more often to see what you've typed. Take your pick.

■ In desktop-publishing programs that have a pasteboard area, it is sometimes easier to drag an item you want to use on another page to the pasteboard instead of using cut-and-paste. Another advantage of dragging an item to the pasteboard is that you don't have to

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Reader Tip of the Month: Word 5.0

Some people have argued that color is unnecessary in word processors, but I disagree. Power users with color monitors can use color in a variety of practical ways:

Editing and proofreading. Change your entire document to blue text. As you proofread your document, change the proofread text to red. Then when you open your document, you'll know exactly what text has and has not been proofed. When editing, you can add new text in red so changes can be quickly identified and verified. For large documents with various people responsible for certain portions of the text, each person can be assigned a different color.

Search and replace. In Word 5.0, you can perform searches based on character attributes. For example, if you want to search and replace every occurrence of *has been* to *has not been*, the process is pretty straightforward. However, if you're working with a large document that has several authors,

you can choose to search and replace only the occurrences of *has been* that are blue. I do a lot of writing and proofreading. Using color-coded searches has revolutionized my work.

Section breaks and headers. When you need logical or visual breaks such as section headings, you can make them a different color. Searching for colored section headings is much easier than searching in all black-and-white text.

You can color text in several ways, and colors can be built in to your style-sheet definitions. You can also add colors to your Format menu. Press Command-D to bring up the Character dialog box. Press Command-Option-+. When your cursor changes to a plus sign, select the color you want to add to the menu from the pull-down Color menu.

T.P. Skaarup
Elk Grove, CA

worry about losing it.

■ Do your AppleTalk connectors ever come loose, causing you to spend a lot of time locating the unplugged connector? Some companies are now gluing the connectors together. Of course, when you change your setup, you have to purchase new connectors, but meanwhile, you have no loose connectors.

■ If you receive essential data on a floppy disk that has a bent shutter, never insert the disk into your Mac with the bent shutter. Instead, completely remove the shutter, being careful not to touch the magnetic medium inside the disk housing. Then immediately insert the shutterless disk into your Mac and make a copy. As soon as you've got what you want, throw the damaged disk away; if you

use it, figure on \$200 to \$450 for repairs or the cost of a new floppy-disk drive.

■ When making QuickKey sequences, don't use up easy-to-use keystrokes on the steps of your sequence. Use oddball combinations of several modifier keys (such as Command-Option-Shift-#) for the parts of the sequence, and then use a simple, easy-to-remember combination for executing the completed sequence.

■ Here is a cute way to put short messages into the main window of a floppy if you're using System 7: Copy a small rectangle of blank space in any painting program. Go back to the Finder. Make a new folder (Command-N), and then, while the folder name is highlighted, select Get Info from the File menu (or press Command-I). Click

on the folder icon at the upper left corner of the Get Info box. Paste. Close the box. Your folder now has no icon in the icon view and small-icon view — just the title line, where you can type your message. If you need more space, duplicate your iconless folder and continue typing. Copy these "folders" onto the floppy, and arrange them to suit yourself. Keep one of these blank rectangles on your desktop for future use.

■ Command-Y in Microsoft Word 5.0 repeats the last text typed. Go ahead, type a few words. Click in another location, and press Command-Y. The typing is repeated in the new location — great if you're typing repeating text into a table or database. And by using the Commands selection on the Tools menu, you can

change the keyboard command equivalent to any key combination you prefer.

■ Here is a nice-looking visual to accompany a Next Card command in HyperCard: **visual iris close to black visual scroll up slow**

If this doesn't thrill you, try some other combination of two or more visual effects — not just one — to dress up your stacks.

Reader Tips

WriteNow 3.0

When you start typing with WriteNow, there's a lot of white space above the first line. Double-click on this white space; you'll get a dialog box that asks if you want to insert a header. Double-click at the bottom of the page

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to get a footer dialog box.
Dennis T. Cheung
New Hyde Park, NY

System 7 Finder

In System 7, when you Option-click on the triangle of a folder in a list view, it opens the folder and all the other folders nested inside that one.

Matthew Burns
Culver City, CA

Map Control Panel

I recently joined the marketing group of a multinational company that has sales offices and salespeople scattered all over the world. As I was getting accustomed to dealing with more than three time zones, I found a way to keep track of local times at various offices without having to remember the names of the cities. Here's what to do:

1. Open the Control Panels folder, on the Apple menu, and double-click on the Map icon.

2. Then locate each sales office by typing the name of the city it's in and clicking on the Find button.

3. Now type the name of the salesperson in that city over the name of the city, and click on the Add City button.

4. Now my coworkers and I need to know only the name of the salesperson. We can search for the salesperson's name and see at a glance whether it's still business hours in that part of the world.

Nitin Apte
Columbus, OH

Adobe Photoshop

If you can't get a decent printout of a scanned image on a LaserWriter, give this

technique for printing scanned images a try. Scan your image at 300 dpi at 256 gray levels. Then, in Adobe Photoshop, use the Despeckle filter on the image. Convert the image to the bit-map mode, using the diffusion dither method.

The dithered bit map looks smoother and more realistic and has more detail. Also, bit-mapped images print in much less time than line-screen images and take up less room on your hard disk.

For best results, use the Image Size command to set the image to the size it will be in the publication. The bit-mapped image may be darker than the original, so adjust the brightness and contrast levels accordingly.

Mark C. Simpson
Bryan, TX

CD-ROM

It's frustrating to try to mount or access a CD-ROM drive and find that the drivers have been damaged. This recently happened to me, and I decided that because the CD-ROM drive was behaving like a crashed hard drive, I would treat it as one. I used Norton Utilities to "unerase" the CD-ROM; the files appeared in the directory, and I could then copy them to my hard disk.

Craig Negoescu
Austin, TX

QuarkXPress 3.1

If you receive a PostScript-error message while printing a QuarkXPress file, you can find the element that created the problem by choosing Print from the File menu and selecting whatever options you want. While holding down

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CIRCLE 168 ON READER SERVICE CARD.

Shift, click on Print in the Print dialog box. You will see a window containing a progress thermometer, naming each element as it is downloaded to the printer as well as the progress status for the overall page and document. This lets you know exactly which element is causing the printing error. You can also use this feature to find out how much longer the file will take to print.

Luc Desaulniers
Montreal, Quebec
Canada

PageMaker

When you're making columns of type in PageMaker and the material under the first tab is bold and that under the second tab is plain, the leader, if any, under the second tab turns out bold. Because you

cannot select the leader in PageMaker, add a space immediately after the bold type, select it, and change it to plain. This also works well if you like small-dot leaders; you can change the type size of the space or, for leaders with very small dots, make the space superscript.

Mike Devereux
Anaheim, CA

Word 5.0

The October 1992 issue of *MacUser* had a tip describing the use of the Symbol font to create straight quotation marks for foot and inch marks. Here's a way for Word 5.0 owners to do the same thing by remembering only one key combination:

Simply press Command-Option-Q. Word displays a table of characters available

in the current font. Then simply point and click on the character you want. The character you select is inserted automatically wherever your cursor is located. This is a lot easier than trying to remember obscure key combinations for several characters.

Patricia A. Black
Rochester, NY

DiskTop

Some older applications and utilities work fine under System 7 but for one minor problem: Their dialog boxes don't have a Desktop button, so all you can see is what's inside a disk, not what's on the desktop. There's also no apparent way to select a file on the desktop. DiskTop — even the latest fix, version 4.0.2 — suffers from this problem. But in DiskTop, the

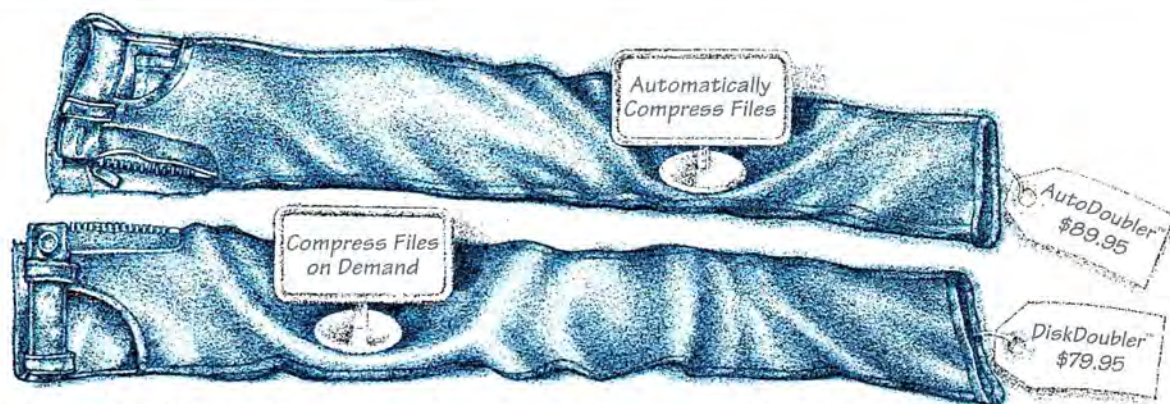
solution is simple. Just look for the Desktop folder, at the first level of your hard disk. Inside that folder, you'll find all the items you have on your desktop.

Joseph Holmes
Brooklyn, NY

Faxing

If you have a fax modem and your corner drugstore offers fax service, you have a low-cost scanner available to you. Simply fax an image to your Mac from the store fax machine. Then use the fax-modem software to save the incoming fax as a PICT or TIFF file. You won't get gray levels or extremely high quality, but it costs much less than service-bureau scanning charges.

Gary McGath
Penacook, NH



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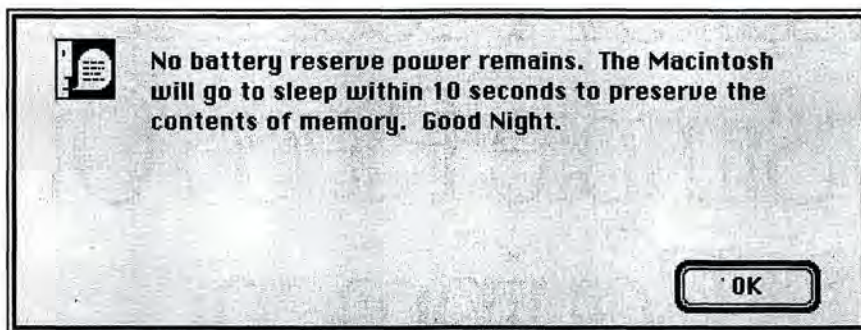
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Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling *Dr. Macintosh*, second edition. Andy Ihnatko is a longtime activist with BCS•Mac. They're both ready to answer your questions about everything Macintosh.

Write to Help Folder, c/o *MacUser*, 950

Tower Lane, 18th Floor, Foster City, CA 94404. Don't want to wait for an answer? Post your

question on ZiffNet/Mac, *MacUser's* on-line service, and get a reply from Bob (76004,2076), Andy (72511,204), or one of the other *MacUser* experts. See the masthead in this issue for instructions on how to sign up.

By Bob LeVitus and Andy Ihnatko

See Me, Read Me

Q. I've been using my PowerBook for a while now, and although I like it a lot, the screen is a little hard on my eyes. Can you recommend a more readable typeface I can use while word processing?

Roger Ebert
via CompuServe

Andy: No sweat, Roger. If you find yourself squinting at the screen but your eyesight isn't so far gone that you need to install CloseView (the optionally installable system software that magnifies any portion of the screen on demand), there are plenty of fonts to choose from (see Figure 1). First, try slumming it with Geneva, one of the PowerBook's built-in fonts, which is uncomplicated and easy to read.

If you find yourself still reaching for the Tylenol after an afternoon's work, check out Boston II and Clairvaux. These fonts date all the way back to 1984 and were originally designed to look good when printed on those

steam-powered, low-resolution ImageWriters. Because the Mac's screen resolution is the same as that of the ImageWriter at its worst, the clarity of these fonts has brought relief to PowerBook users, and like Peter Frampton, they're enjoying a second life after years of obscurity. Boston II and Clairvaux are available free (or for a nominal charge) from on-line services and user groups. Two other highly legible fonts, Lucida and Stone, are commercially available. The two fonts, which are both included in Adobe's library of PostScript fonts, were designed to look good at fax and laser resolutions, and Lucida is exceptionally clear at screen resolutions. Both font packages will set you back a few bucks (Lucida, \$79; Stone, \$119), but the screen (bit-mapped) fonts can be downloaded from most on-line services or purchased from most sources of public-domain software and shareware. You can contact Adobe at 415-961-4400 for more information.

Finally, my personal favorite, readability-wise, is a font called Alice. It was designed for the only Mac game Apple ever wrote and

* ... But Were Afraid to Ask

Why do I enjoy answering simple, uncomplicated questions? Because months of research into the more reputable late-afternoon chat shows have convinced me to get in touch with my inner wild man and other such stuff. However, because this usually involves spending a lot of money on self-help books and seminars and then running around in a forest buck-naked, I've chosen instead to write the attractively hued box you're hanging your eyeballs upon at this very moment.

So to keep me inside and fully clothed, send in those simple, silly, even stupid questions you've been afraid to ask. To protect you from the middle managers who've paid \$450 to smear finger paints on their chests, I'll just say your question was sent in by a favorite from the court of Queen Bess.

Q. My boss was nice enough to buy PowerBook 180s for all the salespeople in our office, hoping that we'd work faster and more efficiently. As good for morale as this might seem, the new notebooks have only served to pit coworkers against each other. Three of us think that the fewer dark pixels there are on the screen, the less power the PowerBook will consume and the longer our batteries will last on the road, so we have set our background patterns completely to white. The others don't think it matters at all. Can you settle this debate?

Lord Edmund Blackadder
Richmond Court

Andy: Hey, Edmund, anything to prevent the pitter-patter of small-caliber gunplay

through the corridors of the modern office. What we have here is an example of the classic struggle between scientists and engineers. You three are scientists, and as such, you're correct: It does require more juice to keep a pixel lit (black) than unlit (white). Thus, it's wiser, in theory, to keep the screen white. The engineers, however, have taken the position that this is a dumb solution, because when your boss bought you that \$3,700 notebook, he was probably sort of hoping that you'd fill the screen with word-processing and spreadsheet windows and not stare at a white screen while gloating over your batteries' longevity.

So if you want to weasel slickly out of any potentially humiliating bet, the door's wide open. But it's a pointless bet — the hard drive and the backlight consume *far* more power, so in any real use of your PowerBook, your white screen won't make a sausage's worth of difference.

If you're *really* interested in conserving power, here are a couple of tips: Turn off the backlight when you don't need it, and use your hard drive as little as possible. I boot from a RAM disk containing just a system, the Finder, and a simple word processor (a RAM disk is a must-have tool for goosing endurance).

If you don't want to go through all that, buy a commercial PowerBook utility such as Norton Essentials for PowerBook (Symantec) or CPU (Connectix). Both feature special power-management software for extending battery life.

Geneva	"Cheshire Puss, would you tell me, please, which way I ought to go from here?"
Boston II	"That depends a good deal on where you want to get to," said the Cat.
Clairvaux	"I don't much care where," said Alice.
Lucida	"Then it doesn't matter which way you go," said the Cat.
Stone	"So long as I get somewhere," Alice added as an explanation.
Alice	"Oh, you're sure to do that," said the Cat, "if you only walk long enough."

Figure 1: Here's a six-pack of supremely readable fonts that are sure to make your PowerBook's screen a little easier on your eyes.

marketed, the infinitely unplayable Through the Looking Glass. For some reason, this font speaks to me. You can get the font from the usual sources (user groups and on-line services). The game, unfortunately, is almost impossible to find.

By the way, System 7 users may have some trouble with the ancient fonts I've mentioned. Unfortunately, you have to install them the old-fashioned way, with Font/DA Mover version 4.1.

Bob: For System 7 users who need a refresher course in installing old fonts, here's how I did it: I created a new font suitcase with Font/DA Mover and then copied all the fonts in the original Boston II suitcase into the new one. I then dragged the new font suitcase onto the System Folder.

I think Lucida is the best of the commercial fonts, even though it's more expensive. Its big advantage is that it prints beautifully to my laser printer. Geneva, Clairvaux, Boston II, and Alice don't. If you use a laser printer with your PowerBook, Lucida is definitely the way to go. (Don't forget: If your laser printer doesn't include PostScript or a PostScript clone, you'll need ATM [Adobe Type Manager] to get high-quality output.)

For what it's worth, Stone

isn't bad either, and it comes in several flavors — Stone Serif, Stone Sans, and Stone Informal — all of which look great on a PowerBook display.

As Andy mentioned, if you want to use Stone or Lucida on your PowerBook screen only, you can download the bit-mapped versions for a few bucks' worth of connect time. They'll look lousy if you print the document, but they look great on-screen.

Get a GREP!

Q. I have a very large client mailing list (8,000 records) in a FileMaker Pro file that I regularly update from on-line information services and printed directories. I have to format these records so that all the fields match the record template in FileMaker.

Depending on the source, some fields are separated by a paragraph return, others by a tab, and some by a comma — even within the same record. I must make these fields fit the record template I set up when I created my FileMaker template. I have been using Microsoft Word 4.0 to globally change the recurring formatting marks, but I can't globally change all commas and returns to tabs, which means I have to make the changes manually — record by grueling record.

Is there a utility that can find commas and replace them

with tabs if they're preceded by two capital letters? My UNIX-savvy friends tell me there are powerful utilities within that operating system that can do this. Is there anything similar for the Mac?

David Carpenter
Cupertino, CA

Andy: Your friends are very wise; give them each a cookie the next time you see them. They're probably talking about GREP (global regular expression parser or, if you prefer, get regular expression and put), a useful and powerful utility that all UNIX folk love and that's become a model for search-and-replace on other platforms.

You'll find that some word processors, such as Nisus (\$395), support "GREP-style searches." Under UNIX, you use GREP by typing in twisted and belovedly complex commands. In Nisus, you click your way through a PowerSearch window, setting up complex searches based on just about any criteria that might occur to you.

I think Nisus is the premier word processor for complicated text bashing, but it's not the only solution. (For more information on Nisus, call Nisus Software at 800-922-2993 or 619-481-1477.) Alternatively, you can get yourself a college intern (who, in my experience, is hired to do dull, repetitive, and eminently unfulfilling tasks for no money) or learn to program. "Lite" scripting languages such as HyperTalk or UserLand's Frontier are easy to learn, and by writing your own code, you can process text and files in ways that would otherwise be impossible.

Or just sit tight and wait for Microsoft to come out with WordBasic, the long-awaited, super-duper, all-singing, all-dancing scripting language that's supposed to be built in to a future version of Word. It'll do everything you ask and

more, but given Microsoft's track record, we may see a new *Star Wars* movie before WordBasic is released.

It's a Weird Word

Q. Seemingly overnight, all of my Word 5.0 files have become ResEdit files to my Finder. That is, when I double-click on them, ResEdit opens, not Word. They will open correctly only if I drag them onto the Word icon. I have looked at each file's type and creator and the files are still nominally Word documents (they also have the proper icon). To try to remedy this, I've rebuilt the desktop a thousand times and reinstalled Word, ResEdit, the Finder, and my System file. I've done everything I can think of but reformatted my hard disk.

Greg Hinson
via CompuServe

Bob: Sounds like you've somehow tricked your Finder into substituting ResEdit for Word. Do you have any software that substitutes applications, such as HAND-OFF II, NowMenus 4.0, On Cue 2, SpeedyFinder, System 7 Pack, or 7th Heaven? It sounds to me as though you've inadvertently instructed one of these programs — or one like them — to substitute ResEdit for Word.

These programs are very helpful if you want to have Word launch all generic text files or Photoshop launch all PICT files, but make sure you haven't unintentionally made any weird substitutions.

V.Hell

Q. I finally upgraded my old 2,400-bps modem to a high-speed one that includes data compression and error checking. I thought it would speed up my on-line sessions; instead, I can no longer log on to some services or download anything from others.

For the moment, I've gone back to my 2,400-bps modem,



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POWER TOOLS HELP FOLDER

but I still have an expensive modem that does nothing but flash pretty lights at me. What's wrong?

Edward Chen
Troy, NY

Andy: Problems like yours are usually caused by the modems' inability to negotiate features they have in common. You probably need to dive into your modem's manual and bone up on its extended command set, so you might consider just chucking it all and learning to use a fax machine instead.

Those electronic shrieks you hear through the speaker when your modem attempts to connect to another system are actually the two modems figuring out what sort of device is on the other end of the line. A good-quality modem turns off whichever features it can't use for the duration of the call; others that aren't quite so clever try to make a connection with compression and error checking intact. When they can't manage this, they simply inform you that they couldn't connect rather than settle for a simpler connection. Still others connect normally, but when you try to download something, the lack of an expected error-checking protocol destroys the transmission.

So here's what you should do: Learn the extended commands for turning off data compression and error checking. Unfortunately, these commands can vary from modem to modem. As an example, take USRobotics' command set: AT&M0 turns off error checking, and AT&K0 nixes the compression. You then need to attempt to dial in to the problem service by tossing these commands into your dialing string one at a time, as in this example:


AT&M0DT6617071

This tells the modem to dial 661-7071 and, *for this call only*, not to even try to use

automatic error checking. If all goes well, great! Tell your comm program to enter that command every time it attempts to dial up that service. The alternative is to enter it manually (AT&M0) and then write that change to the modems' nonvolatile memory (AT&W), but your modem won't use that feature on every service you dial. Better to embed it in the dialing string.

If turning both features off has no effect, examine the way your modem handles flow control, which is the signals it uses to determine whether or not it's OK to send data to your Mac or to the remote computer to which you're connected. If your modem thinks it's *never* OK to send data to the remote system, you have a problem. A modem that seems to connect to a remote system but then does nothing often responds well if you throw a Disable Flow Control command into the dialing string.

Now that I've earned my dough with that piece of long-winded technical advice, I'll give you the straight, effective answer: Pick up the phone, call the on-line service, and ask for help. Questions such as "Why can't I log on with my DiscoModem 9600?" usually stump them only once. Chances are they have heard that complaint before and can quickly tell you to use a dialing command that's about as long as your arm. I know this method resorts to using your phone for disgustingly analog purposes, but sometimes that's the price of cutting-edge technology.

Bob: I can't pass up this opportunity to shamelessly promote our new book, *Dr. Macintosh's Guide to the On-Line Universe*, coauthored by none other than the master of modem wizardry himself, Andy Ihnatko. If you enjoyed the preceding paragraphs, you'll love the book. 

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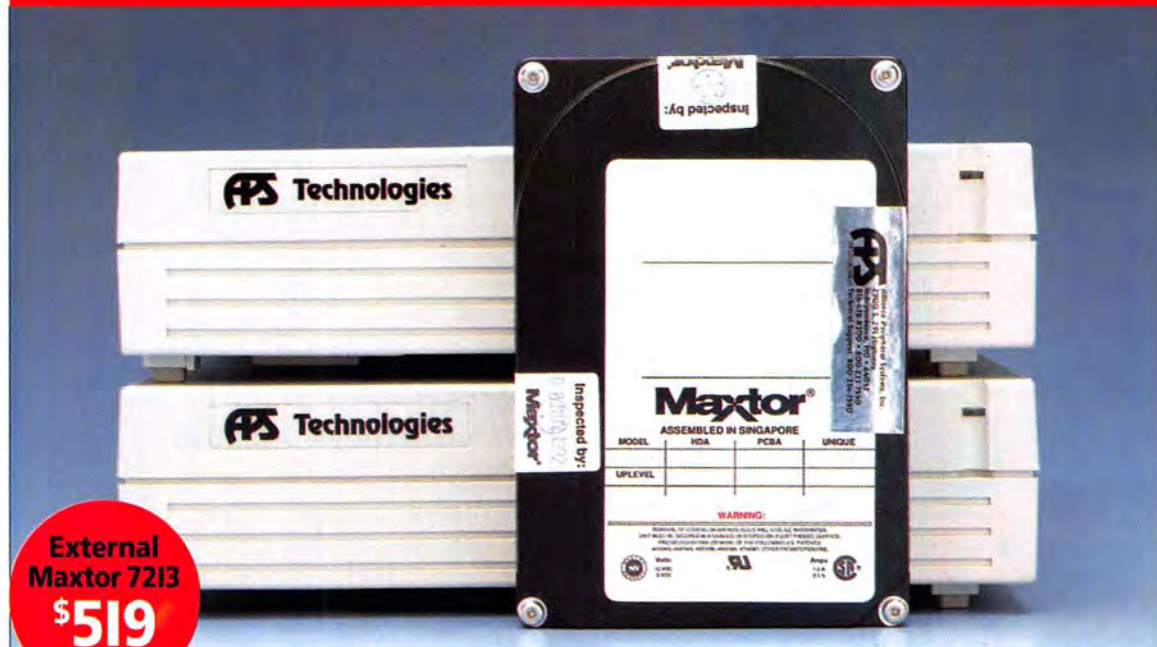
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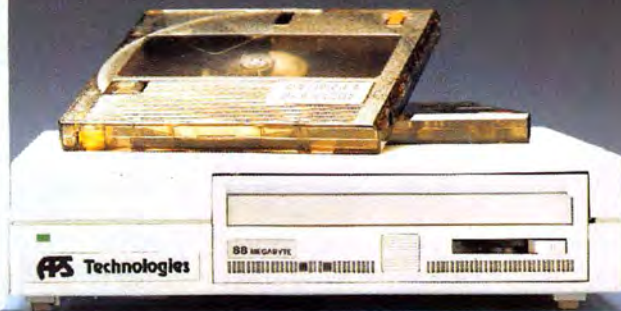
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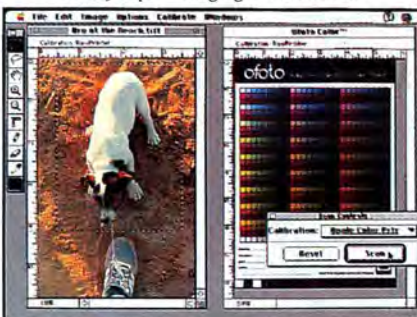
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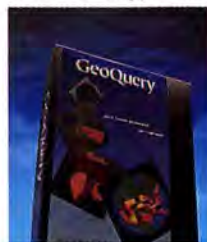


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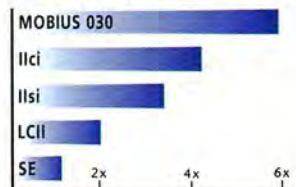


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1. For how many micro computers do you buy products? (check one)

☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

2. Your primary job function is: (check one)

☐ 01) Administrative/General Management ☐ 03) Engineering/R&D
☐ 02) MIS/DP, Communications Systems, Programming ☐ 04) Finance/Accounting
☐ 05) Marketing/Sales ☐ 06) Computer Dealer/VAR

3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

SOFTWARE

Accounting ☐ 01 ☐ 01
 Spreadsheets ☐ 02 ☐ 02
 Project Managers ☐ 03 ☐ 03
 Word Processors ☐ 04 ☐ 04
 Database Managers ☐ 05 ☐ 05
 Graphics ☐ 06 ☐ 06
 Integrated Software ☐ 07 ☐ 07
 Communications ☐ 08 ☐ 08
 Utilities ☐ 09 ☐ 09

HARDWARE

Modems
 Scanners
 Microcomputer
 Printers/Plotters
 Monitors/Displays
 Storage
 Add-in Boards
 Networking

03 04

☐ 10 ☐ 10
☐ 11 ☐ 11
☐ 12 ☐ 12
☐ 13 ☐ 13
☐ 14 ☐ 14
☐ 15 ☐ 15
☐ 16 ☐ 16
☐ 17 ☐ 17

5. If so, what function do you serve in the buying process? (check all that apply)

☐ 01) Initiation/Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)

☐ 01) over \$5 million ☐ 05) \$50,000 - \$99,999
☐ 02) \$1 - 5 million ☐ 06) \$10,000 - \$49,999
☐ 03) \$500,000 - \$999,999 ☐ 07) under \$10,000
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Database Managers ☐ 05 ☐ 05
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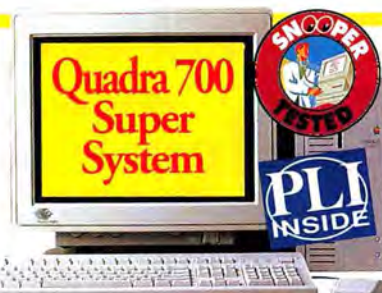
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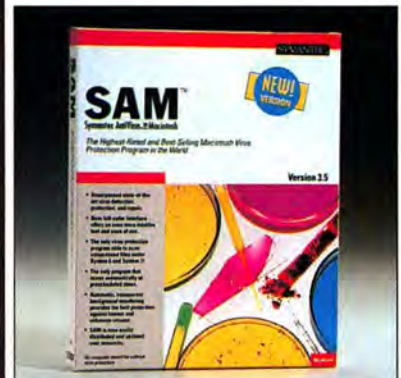
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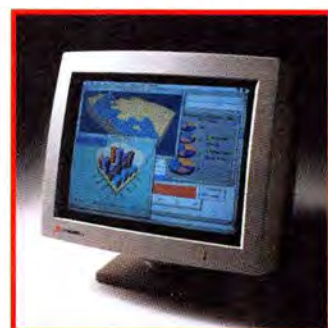
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La Cie's Tsunami and Cirrus drives like to be driven hard and fast.

Lap the competition.

La Cie's Cirrus and Tsunami drives outpace the competition for performance and value. That's because they're loaded with quality features like Quantum mechanisms, whisper quiet fans, 12ms access time, award-winning chassis designs and our Silverlining disk management software. From 40MB to 1.2GB take home your pick of load capacities. Each delivers the streamlined styling, diminutive footprint and single-handed convenience of the true portable. And that's not all. All Cirrus and Tsunami drives offers the La Cie's exclusive active switchable termination. No wonder they're rated tops in their class, year after year.

Never be afraid to internalize your drives.

If the fear of installation has deterred you from satisfying your desire for a more powerful internal drive, stop fretting. La Cie not only offers a full range of quality Quantum drives for your Mac, PowerBook or Quadra, we make them easy to install. Each La Cie disk comes complete with the correct bracket hardware for internal installation, and an outstanding easy-to-read, easy-to-follow instruction manual, plus all the no-extra-charge, toll-free telephone technical support you need to make the job quick, convenient, and painless.

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Avoid crashes.



La Cie's 3 1/2" Optical drives don't need air bags or anti-lock brakes.

Full lite speed ahead!

It's hard to beat the safety record of optical drive technology. And now you can achieve long range data safety with the next generation of removable-media optical drive technology. Smaller, faster and less expensive than conventional 5 1/4" optical drives, La Cie's Cirrus Optical drives use disks that are the same size as 3 1/2" floppies, but store about eighty-eight times more data than high-density floppy disks.

The Cirrus Optical also delivers a speedy 38ms seek time. Tailored to fit our sleekly-styled, award-winning Cirrus chassis, whisper quiet, fan-cooled Cirrus Optical drives offer massive storage capacity, lightweight portability, high-speed performance and removable media convenience.

Lite speed performance for Quadra.

Doesn't your Quadra deserve the speed and safety performance of our La Cie 3 1/2" Optical drives? We think so too. That's why we make brackets (and a really good instruction manual) available for mounting this money-wise, crash avoidance system inside your Quadra.

Silverlining, 1-year warranty, super support.

Every La Cie Cirrus Optical drive comes complete with System 6, System 7 and Silverlining—the industry's number one rated disk management software. Plus you get a full year's parts and labor warranty with two day warranty replacement. What more can you ask? 30-day, 100% Satisfaction Guarantee, that's what.

C H E C K O U R L I S T

- ☒ **All La Cie products are agency certified.** Uncertified equipment can be unsafe. Products sold without FCC certification are even illegal. Yet, non-certified equipment is sold every day. Check certification before you buy, to make sure no one sells it to you. We also burn in every drive for 24 hours for your protection.
- ☒ **La Cie is a real manufacturer—not just a reseller.** You learn a lot when you manufacture your own products. What works. What doesn't. And why. That's why we're never stumped for an answer when you need help. That's why—by anticipating problems—we can avoid them. And that's why our customers are bowled over with our service and support—not just blown off.

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La Cie's DAT drives can backup without making you go in reverse.

Get it on tape.

Not backing up safely is like driving without car insurance. It can be very costly in the event of an accident. For safe, cost-effective backup La Cie's 155MB tape drives offer quality TEAC mechanisms and removable convenience. Or step up to our 600MB tape drives. They have the same TEAC quality, but with four times the storage. Now that's win-win.

DAT drives incredible.

For incredibly fast tape back-up and restore for your Mac try our La Cie 4mm DAT drive. With 1.3 to 2 gigabytes of storage on each cassette, standard DDS recording format, and reliable Archive electronic tape handling, you get high capacity, high reliability, and exceptional performance at an incredible value.

Compression engine performance.

For even higher revving capacity tape back-up for your Mac look at our La Cie Compression DAT Drive! With up to 8GB of storage on each 4mm cassette, our jumbo capacity Compression DAT drive offers true computer grade performance and reliability—not to mention HP technology, and industry-standard DDS-DC data compression.

The La Cie advantage.

Like every La Cie product we sell, our tape drives are feature rich. Engineered within our award-winning Cirrus case, each comes complete with universal power supply, half-speed fan, SCSI cable and power cord, free tape cartridge, Retrospect™ software and our exclusive on/off termination switch.

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Our lot has great selection



Internal, ZFP™, ZFP+™, Cirrus™ & Tsunami™ Drives

Our hard drives feature a wide selection of capacities and quality brand-name mechanisms—all at very affordable prices. All drives have switchable active termination, efficient, quiet fans and universal power supplies.*

Quantum	Internal	ZFP	Cirrus	Tsunami
40MB (3 1/2")	\$199	\$299	\$319	\$349
85MB (3 1/2")	\$279	\$379	\$399	\$429
120MB (3 1/2")	\$399	\$499	\$519	\$549
127MB (3 1/2")	\$339	\$439	\$459	\$489
170MB (3 1/2")	\$369	\$469	\$489	\$519
240MB (3 1/2")	\$589	\$689	\$709	\$739
525MB (3 1/2")	\$1149	\$1249	\$1269	\$1299
700MB (3 1/2")	\$1329	\$1429	\$1449	\$1479
1.05GB (3 1/2")	\$1669	\$1769	\$1789	\$1819
1.2GB (3 1/2")	\$1899	\$1999	\$2019	\$2049
80MB (2 1/2") for Powerbook	\$369	See PocketDrive		
120MB (2 1/2") for Powerbook	\$469	See PocketDrive		
160MB (2 1/2") for Powerbook	\$699	See PocketDrive		

Seagate	Internal	ZFP+	HP	Internal	ZFP+
1.2GB (3 1/2")	\$1799	\$1899**	1.05GB (3 1/2")	\$2099	\$2199**
650MB (5 1/4")	\$1299	\$1449	700MB (5 1/4")	\$1499	\$1649
1.2GB (5 1/4")	\$1749	\$1899	1.2GB (5 1/4")	\$1989	\$2139
1.6GB (5 1/4")	\$2299	\$2449	1.6GB (5 1/4")	\$2399	\$2549
2.1GB (5 1/4")	\$2949	\$3099			
2.4GB (5 1/4")	\$3299	\$3449	DEC	Internal	ZFP+
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**Available only in our award winning Cirrus and ZFP half-height cases.



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Pack more power in your Powerbook. Comes with brackets and instructions.

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Hailed as one of the most powerful and useful hard disk management software available, Silverlining offers unique features found no where else! Give your hard disk a Silverlining.

Silverlining	\$149
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128MB 3 1/2" Optical Drive with Retrospect	\$1399	\$1499
128MB Optical Disk	\$1499	\$1599
		\$79

*While supplies last

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Our Cirrus backup solutions have the power to handle large backup jobs. Includes Retrospect™ and 1 free tape.

	Internal	External
155MB Tape Drive		\$549
600MB Tape Drive	\$699	\$799
1.3-2.0GB DAT	\$1249	\$1349
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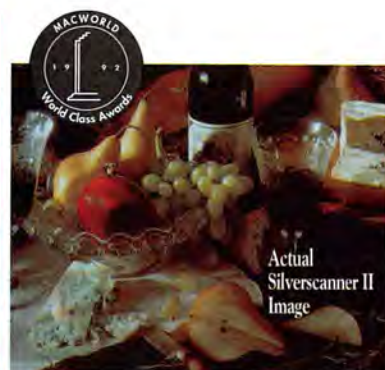
Our 44-88MB removable media drives deliver Syquest technology in a zero footprint case. Includes 1 free cartridge.

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44MB Cartridge	\$63
88MB Cartridge	\$98

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Here's tight security and portability. La Cie Express Drives offer removable drive convenience and Quantum quality.

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120MB Quantum LPS Drive	\$469
240MB Quantum LPS Drive	\$819



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Air-tight security.

Portability like no other. La Cie ExpressDrives offer removable drive convenience, Winchester drive performance and Quantum quality. Uniquely engineered for high-security applications, the ExpressDrive's external chassis houses the power supply, fan, cable connectors and our exclusive switchable active termination and SCSI ID. Sealed in packages about the size of a 1/2" video tape, our compact removable hard drive mechanisms are sealed from airborne particles and can be easily removed and locked away. Available in 50MB, 100MB, 120MB and 240MB capacities, each comes preformatted with our award-winning Silverlining software.

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The number one choice of mass media movers, our La Cie 44MB and 88MB removable media drives deliver dependable SyQuest technology in a zero footprint case. Convenient, affordable. Removable media drives let you archive it. Send it to your service bureau. Deliver data to another department. La Cie's removable media drives stack up limitless storage and convenience. And that's not all. Each La Cie work-horse SyQuest media drive includes our whisper quiet fan, switchable SCSI ID, and La Cie's exclusive award-winning Silverlining hard drive management software, not to mention one free cartridge.

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\$119 With Nubus Card



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	Logitech Scanman 32 Mac.....269
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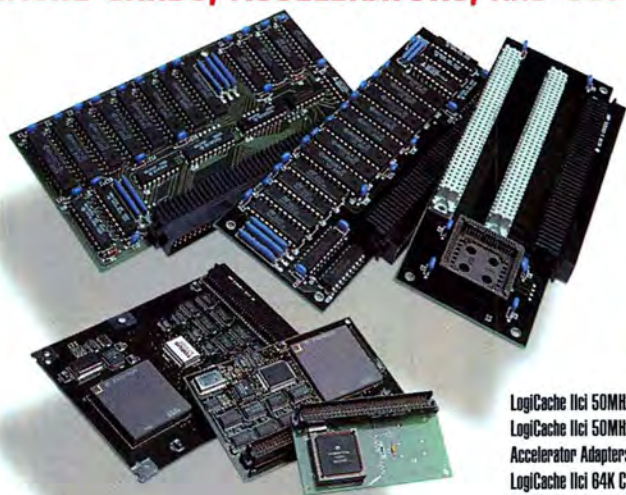
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All SyQuest drives feature 20MS average seek time, and 60,000 MTBF. Kits include one cartridge, external SCSI cable and formatting utility. All MacTown removables and cartridges carry a one year warranty. Internal kits compatible with Quadra 900/950 models only.

Two Year Warranty! Maxtor®

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213MB	MC7213/15MS	\$ 449	\$ 529
340MB	LXT340/13MS	\$ 640	\$ 709
535MB	LXT535/12MS	\$ 959	\$1029
670MB	XT8760/16.5MS	\$1195	\$1345
1020MB	PO-12S/13MS	\$1475	\$1625
1500MB	P1-17S/13MS	\$1699	\$1849
1240MB	MXT1240S/8.5MS	\$1999	\$2079

Maxtor drives feature 150,000 hours MTBF. MXT1240 drive features 300,000 MTBF. Maxtor drives include a two year warranty. Internal full-height drives for the MAC II, IIX, IIFX and Quadra 900/950 only.

OPTICAL

CD ROM Toshiba External	\$ 539
Teac 120MB 3.5" Read/Write	\$1179
Additional Cartridges	\$ 59
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Capacity	Description	Internal	External
42MB	ELS42/19MS	\$ 199	\$ 269
85MB	ELS85/17MS	\$ 269	\$ 339
127MB	ELS127/17MS	\$ 339	\$ 409
170MB	ELS170/17MS	\$ 399	\$ 469

Quantum drives feature 100,000-200,000 hrs MTBF and a two year warranty.

Seagate

Capacity	Description	Internal	External
248MB	ST3283N/12MS	\$ 515	\$ 585
426MB	ST1480N/14MS	\$ 899	\$ 979
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676MB	ST4767N/12MS	\$1399	\$1599
1050MB	ST41200N/15MS	\$1399	\$1625
1050MB	ST11200N/10MS	\$1699	\$1769
1352MB	ST41600N/12MS	\$1849	\$2025
1900MB	ST42100N/12MS	\$1899	\$2075
2100MB	ST42400N/11MS	\$2749	\$2999
2750MB	ST43400N/11MS	\$4099	\$4199

Seagate drives feature one year warranty. Internal full-height drives for the MAC II, IIFX and the Quadra 900/950 only.

TAPEBACKUP SYSTEMS

Capacity	Description	Internal	External
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250MB	WangTEK	\$ 529	\$ 599
525MB	WangTEK	\$ 799	\$ 875
600MB	Teac	\$ 599	\$ 669
2.0GB	Exabyte-4200 DAT	\$1229	\$1299
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5.0GB	Exabyte-8500		\$2799

All tape backup external kits come complete with software, external SCSI cable and one tape. Internal kits compatible with Quadra 900/950 models only.

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6FG™ 21" Monitor	2,359

Mac II, Quadra compatible (w/extra cable adapter)

Radius Monitors/Adapters

PrecisionColor Pivot	\$999
Pivot Display (low emission)	699
PrecisionColor Display/20	2,759
PrecisionColor Display/19	2,089
Color Pivot	1,289
Full Page Display	579
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Berkeley Systems

5341 Star Trek the Screen Saver\$35.

1232 After Dark\$29.

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VideoFusion is a complete software solution for QuickTime post-production. Create compelling movies using unlimited layering and alpha channel support to combine video, text, and graphics. Extensive libraries of transitions, DVE moves, warps, and morphs give your movies a professional look. Non-linear editing completes this powerful special effects application.

VideoFusion

5165 VideoFusion\$448.



Best Compression Product Finalist – TimesTwo

TimesTwo actually makes your hard disk bigger rather than making your files smaller! A one-time installation converts your hard disk to twice its original size in minutes, leaving your data unchanged. It's completely compatible with all Mac software and works with all SCSI and erasable optical disks.

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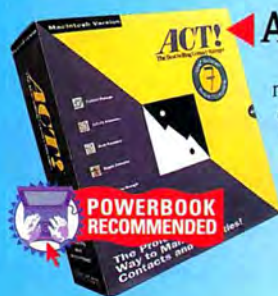
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Pixar

5123 Typestry \$184.

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The Wall Street Journal calls it "A wonderful new preschool math program..." **Millie's Math House** was designed by early childhood experts and gives children ages 2 to 6 the building blocks for a solid foundation in math. Six engaging activities packed with essential learning concepts are included. Sound effects and colorful characters inspire kids to explore and learn!

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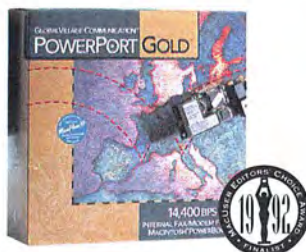


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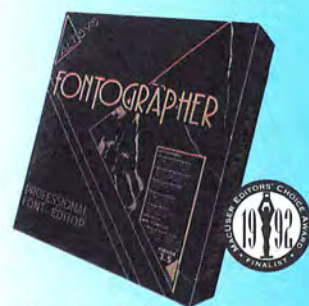


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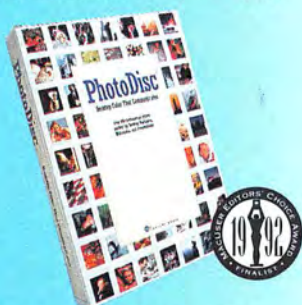


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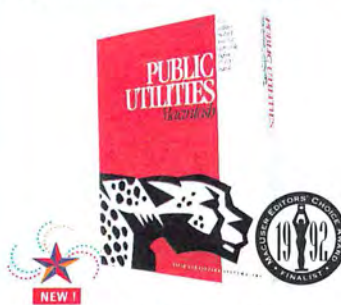


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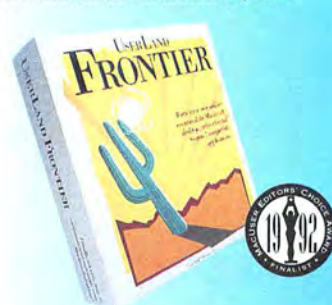


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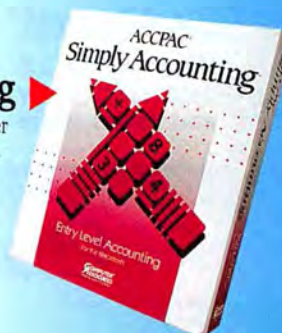
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Computer Associates
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Microtek
5238 ScanMaker II \$928.
5239 ScanMaker IIxe \$1,239.



Icon Gallery

Jazz up your System 7 desktop with **Icon Gallery**, the Mac-world's largest color icon collection. More than 850 itty bitty icon masterpieces will add pizzazz and personality to any document. You don't have to be an artist, just select "get info" and then paste. Also works great in grayscale.

Component Software
5519 Icon Gallery \$38.



IT'S EASY TO ORDER!

ORDERING INFORMATION

- Call 1-800-367-4222 anywhere in the USA or Canada. Call (206) 883-8312 for international orders.
- Fax your order to 206-881-3090.
- Mail your order to 8461 154th NE, Redmond, WA 98052.
- For electronic orders, use Compuserve (76635,660), GEnie (MACSPPLACE), or America Online (Mac'sPlace).
- Mac's Place uses CE Software's QuickMail to check our mail regularly.

ORDERING HOURS

- Mac's Place is open from 6 a.m. to 10 p.m. M-F Pacific Standard Time, and 6 a.m. to 6 p.m. on weekends. (For you East Coasters, this means you can call us until 1 a.m. weekdays and still receive your in-stock item that morning!)

PAYMENT OPTIONS

- VISA, MasterCard, American Express, OPTIMA, and Discover Card gladly accepted.
- Your credit card is never charged until your product ships.
- Most personal and company checks are approved quickly to ensure immediate shipment. For non-standard checks and checks over \$1,000, allow ten working days for clearance.
- Government, school, and institutional P.O.s clear immediately. Corporate P.O.s are subject to credit approval for first order.

SHIPPING INFORMATION

- All in-stock items ship same-day, (barring system failure, etc.) to your doorstep, for just \$3 (USA) via Airborne Express overnight service. Rural locations may require an additional day for delivery. Areas not


served by Airborne Express will be sent via Priority Mail. Our \$3 shipping charge includes insurance at no extra charge.

- When a partial order is shipped, we pay freight on additional shipments.

INTERNATIONAL ORDERS

- Call 206-883-8312 for our international sales line.
- We ship throughout the free world via Airborne Express International.
- International orders will be charged full shipping rates.
- Mail, fax, or electronic orders gladly accepted.

RETURNS

- All products carry a 120-day limited warranty from Mac's Place.
- Defective software is replaced immediately with like items. Defective hardware items repaired or replaced at our discretion.
- Some hardware items carry one-, two-, or five-year warranties.
- Products with the  symbol carry a manufacturer's 30- or 60- day Money Back Guarantee.

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NOW Writes 44mb cartridges

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	QTY 1	QTY 10
44mb Cartridge	\$64	\$62
88mb Cartridge	\$99	\$96

NEW

NEW

NEW

ClubMac 44MB REMOVABLES

ClubMac 44mb External (SQ555)	\$389
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ClubMac 44mb Dual	\$729

ClubMac 88MB REMOVABLES

ClubMac 88mb External (SQ5110)	\$489
ClubMac 88mb Internal	\$469
ClubMac 88mb Dual	\$899

ClubMac 88c REMOVABLES

ClubMac 88c External (SQ5110C)	\$619
ClubMac 88c Internal	\$599
ClubMac 88c Dual	\$1149

* SyQuest Drives include a TWO Year Warranty, one cartridge & necessary cables, SCSI Director™ Formatting Utility • SyQuest Cartridges carry a ONE Year Warranty.

Quantum

Unformatted Capacity	Model	Average Access	Actual MAC Capacity	Internal	External
GO DRIVES 2.5" LOW PROFILE FOR NOTEBOOKS					
80mb	GO-80	17ms	80mb	\$325	\$425
120mb	GO-120	17ms	120mb	\$455	\$555
ELS DRIVES 3.5" LOW PROFILE & LOW POWER					
42mb	ELS42	19ms	40mb	\$185	\$245
85mb	ELS85	17ms	82mb	\$239	\$299
127mb	ELS127	17ms	124mb	\$309	\$369
170mb	ELS170	17ms	160mb	\$345	\$405
LPS DRIVES 3.5" LOW PROFILE & HIGH PERFORMANCE					
240mb	LPS240	10ms	234mb	\$519	\$579
525mb	LPS525	10ms	525mb	\$1049	\$1109
PRO DRIVES 3.5" HIGH CAPACITY & PERFORMANCE					
425mb	PRO425	19ms	406mb	\$899	\$959
700mb	PRO700	10ms	700mb	\$1249	\$1309
1.0GIG	PRO1050	10ms	1.0GIG	\$1529	\$1589
1.2GIG	PRO1225	10ms	1.2GIG	\$1699	\$1759

ELS, LPS, PRO drives carry a TWO Year Warranty. Go-Drives carry a ONE Year Warranty.

**FIVE
YEAR
WARRANTY**

FUJITSU

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
425mb	M2623SA	3.5" Half Height	9ms	405mb	\$965	\$1025
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$1025	\$1085
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	\$1579	\$1679
2.0GIG	M2652	5.25" Full Height	14.5ms	1.6GIG	\$2679	\$2779

NEW

CONNER

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
85mb	CP30080E	3.5" Low Profile	17ms	82 mb	\$239	\$299
120mb	CP30100	3.5" Low Profile	19ms	116 mb	\$289	\$339
170mb	CP30170E	3.5" Low Profile	9ms	160 mb	\$329	\$379
212mb	CP30200	3.5" Low Profile	9ms	206 mb	\$459	\$519
540mb	CP30540	3.5" Low Profile	8.5ms	515 mb	\$995	\$1055

Conner drives carry a ONE Year Warranty.

ClubMac OPTICAL Drives

Model	Capacity	Description	Seek	External
CMO-OD3000	Teac	128mb 3.5" Half Ht	45ms	\$1049
CMO-LF3004	Panasonic	128mb 3.5" Half Ht	45ms	\$1129
CMO-3100E	Ricoh	128mb 3.5" Half Ht	45ms	\$1089
CMO-3051E	Ricoh	594/652mb 5.25" Full Ht	28ms	\$2399
TAHITI II	MaxOptix	650/1.0GIG 5.25" Full Ht	35ms	\$3269
128mb Cartridge	3.5" Single Sided			\$39
594/652mb Cartridge	5.25" - 512/1024 bytes/sec			\$99

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

Maxtor

Price Point
and
Performance



Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
XT SERIES (3.5" LOW PROFILE)						
120mb	7120XT	3.5" Low Profile	15ms	121mb	\$299	\$359
207mb	7213	3.5" Low Profile	15ms	202mb	\$439	\$499
LXT SERIES (3.5" HALF HEIGHT)						
330mb	LXT-340	3.5" Half Height	15ms	324mb	\$639	\$699
535mb	LXT-535	3.5" Low Profile	12ms	510mb	\$989	\$1049
XT-8000 AND PANTHER SERIES (5.25" FULL HEIGHT)						
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	\$1179	\$1279
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	\$1485	\$1585
1.7GIG	PO-17S	5.25" Full Height	13ms	1433mb	\$1749	\$1849

Maxtor 3.5" Drives carry a ONE Year Warranty. Maxtor 5.25" Drives carry a TWO Year Warranty.

Seagate

ELITE SERIES


Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
1.6GIG	ST41651N	5.25" Full Ht Wren-8	15ms	1350mb	\$1909	\$2009
2.1GIG	ST42100N	5.25" Full Ht Wren-9	12.9ms	1900mb	\$2129	\$2229
1.6GIG	ST41600N	5.25" Full Ht Elite-1	11.5ms	1307mb	\$2069	\$2169
2.4GIG	ST42400N	5.25" Full Ht Elite-2	11ms	2050mb	\$2949	\$3049
3.4GIG	ST43400N	5.25" Full Ht Elite-3	11ms	2750mb	\$4129	\$4229

Seagate Drives carry a ONE Year Warranty.

TAPE BACKUP Systems

Bundled with
RetroSpect v.1.3c
Backup Software



Capacity	Model	Description	Media	Internal	External
155mb	Teac MT2ST/N50	Analog	CT600N	\$469	\$489
600mb	Teac MT2ST/F50	Analog	CT600F	\$679	\$699
2.0GIG	ARDAT	DAT, DDS	4mm	\$1219	\$1239
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	\$1249	\$1269
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm	\$1489	\$1499
2.0GIG	HP 35470A	DAT, DDS	4mm	\$1329	\$1349
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	\$1529	\$1549
2.2GIG	Exabyte EXB-8200	Digital/Helical	8mm	\$1859	\$1869
5.0GIG	Exabyte EXB-8500	Digital/Helical	8mm	\$2849	\$2849

Includes RetroSpect v.1.3c Backup Software, One Tape and ONE Year Warranty

DAYSTAR DIGITAL

POWERCACHE (Classic, SE, LC, SE/30, II, IIX, ILCX, ILSI, ILCI, Performa)

33 MHz PowerCache*	\$389	\$479
40 MHz PowerCache*	\$559	\$649
50 MHz PowerCache*	\$729	\$859
Equalizer LC	\$169	\$239
PowerCache Adapter	\$41	

*PowerCache Adapter not included

MACINTOSH MEMORY

QUADRA 950

16mb Module	\$540
256 VRAM	\$Call
Video (Q700/Q900)	
256 VRAM	\$Call

MODEMS

SupraFAX Modem V.32bis \$349

14.4 S/R fax,
14.4 data modem
v.32bis, v.42bis,
MNP 5 w/Fax



COLOR SCANNERS



ES-600C (ScanTastic)	\$949
ES-600C (Adobe Photoshop-Full Vers & ScanTastic)	\$1219
ES-800C (ScanTastic)	\$1299
ES-800C (Adobe Photoshop and ScanTastic)	\$1499
Auto. Doc. Feeder (ES-600C and ES-800C)	\$469
Transparency Unit (ES-600C and ES-800C)	\$769

MICROTEK

ScanMaker II (Adobe Photoshop LE)	\$889
ScanMaker IIXE (Adobe Photoshop-Full Vers)	\$1185

33 MHz TURBO 040	\$1429
FASTCACHE TURBO 33	\$359
CHARGER	\$859

CACHE CARDS

FastCache ILSI	\$279
FastCache ILSI with 68882	\$349
FastCache ILCI	\$215
FastCache Quadra-Q700/900	\$259
FastCache Quadra-Q700/900/950	\$399
EXPANSION BOARDS	
DualPort ILSI	\$165
PowerMath LC	\$115

MACINTOSH MEMORY

1mb X 8-80ns	\$32	4MB Memory Module	\$234
2mb x 8 - 80ns	\$64	6MB Memory Module	\$324
4mb X 8 - 80ns	\$124	POWERBOOK 160/180	
16mb X 8 - 80ns	\$540	8MB Memory Module	\$387
Mac IIfx		10MB Memory Module	\$469
1mb X 8 - 80ns	\$33	Duo 210/230	
4mb X 8 - 80ns	\$130	4MB Memory Module	\$387
16mb X 8 - 80ns	\$Call	8MB Memory Module	\$634



PowerModem I (24/96/48 S/R fax modem)	\$135
PowerModem II (24/96/96 S/R fax modem)	\$235
PowerModem III (96/96 S/R fax modem)	\$339
PowerModem IV (14.4/14.4 S/R fax modem)	\$419

EPSON and ScanTastic

NEC

MULTIMEDIA-GALLERY

CDR-74	\$799
MULTIMEDIA GALLERY	
CDR-74 (Mac Interface)	\$619



CD EXPRESS

CDR-25	\$395
EXPRESS BUNDLE	

NEC CD-ROMs FOR THE PC

CDR-74 PC Multimedia Gallery	\$799
CDR-74 with PC Interface	\$649
CDR-25 PC Express Bundle	\$395



MODEL 95	\$1399
MODEL 97	\$1719

"BUILT-IN POSTSCRIPT FAX"

MODEL 95Fx	\$1859
MODEL 97Fx	\$2199

- Adobe PostScript Level 2 • 6 ppm (Model 97 • 10 ppm) • 300 dpi
- 35 fonts • 2 MB RAM standard • Auto Interface Monitoring
- AppleTalk, Serial & Parallel Interface



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MultiSync 3FGx (15")	\$629
MultiSync 4FG (15" with AccuColor)	\$759
MultiSync 5FG (17" with AccuColor)	\$1315
MultiSync 6FG (21" with AccuColor)	\$2399
Mac FG 8X / 24X Interface	\$659/\$1235

SUPERMAC

GRAPHIC DISPLAYS	
SuperMatch 21 Two Page Color	\$2525
SuperMatch 20-T Multimode Trin	\$2525
SuperMatch 20 Color	\$1499
SuperMatch 17-T Trinitron	\$1099
21 Platinum (Black and White)	\$999

DIGITAL VIDEO BOARDS / ACCELERATION	
Video Spigot (NuBus / ILSI / LC)	\$379/\$35/\$249
VideoSpigot Pro (NuBus / ILSI)	\$1095/\$1265
Spigot and Sound NuBus / Pro	\$479 / \$1179
ThunderStorm	\$819

WARRANTY
Graphic Cards • 5 YEAR
Graphic Displays • 3 YEAR

GRAPHIC CARDS	
Thunder/24	\$2345
Thunder/8	\$1169
Spectrum/24 Series IV	\$839
Spectrum/8-24 PDQ	\$829
Spectrum/8 Series III	\$419

ACCELERATORS

Radius Rocket 25i	\$1199
Radius Rocket 33	\$1989
RocketShare	\$399
SCSI-2 Booster	\$249

RADIUS DISPLAYS

Color Display/21	\$2999
PrecisionColor Pivot	\$945
PrecisionColor 20/S	\$2319
PrecisionColor/20	\$2319
PrecisionColor/19	\$2029
Full Page Display	\$569
Monochrome Pivot	\$699
Two Page Display/19	\$899
Two Page Display/21	\$1149
Two Page Display/21E	\$1299

radius

RADIUS VIDEO CARDS

VideoVision \$1949

Everything you need to create hot desktop video presentations. Mix and record high quality video, audio, and MAC graphics to videotape.

PrecisionColor 8XJ	\$489
PrecisionColor 24X	\$1629
PrecisionColor 24XP	\$489
PrecisionColor 24XK	\$809
Color Pivot (II NuBus, ILSI, LC, SE/30)	\$499
Pivot (SE/30, II NuBus, LC)	\$249
TPD (Mac II, ILSI, SE, SE/30)	\$379
PowerView	\$489

ASANTÉ

MAC II (NuBus)

Thick/Thin/10BaseT, 64K	\$199
Thick/Thin, 64K	\$149
Thick/10BaseT, 64K	\$149

MAC ILSI & SE/30 (Q30 PD8)

Thick/Thin/10BaseT, 64K, FPU Socket	\$199
Thick/Thin/10BaseT, 64K, FPU Chip	\$289
Thick/Thin, 64K, FPU Socket	\$149
Thick/Thin, 64K, FPU Chip	\$239
Thick/10BaseT, 64K, FPU Socket	\$149
Thick/10BaseT, 64K, FPU Chip	\$239

MAC LC & LCII (Q20 & Q30 PD8)

Thin/10BaseT, FPU Socket	\$199
Thin/10BaseT, FPU Chip	\$289
Thick/Thin, 64K, FPU Socket	\$149
Thin, FPU Chip	\$239
10BaseT, FPU Socket	\$149
10BaseT, FPU Chip	\$239

MAC SE (88000 PD8)

Thick/Thin/10BaseT, 32K	\$199
Thick/Thin, 32K	\$149
Thick/10BaseT, 32K	\$149

SCSI PRODUCTS

Thick/Thin/10BaseT, Includes SCSI	\$299
PowerBook, Thick/Thin/10BaseT	\$329
10BaseT, Includes SCSI Cable	\$239
PowerBook, 10BaseT, Includes SCSI	\$269
HDI-30 & DB-25 cable for PowerBooks	\$45

FRIENDLYNET ADAPTERS

Thin FriendlyNet Media Adapter	\$79
Thick FriendlyNet Media Adapter	\$79
10BaseT FriendlyNet Media Adapter	\$79

10BASET

10BaseT Hub w/12 10T, Thick & Thin ports	\$479
10BaseT Hub w/8 10T, Thin ports	\$239
12-port Smart Hub	\$779
12-port Smart Hub w/SNMP H/W Module	\$899
1012 & AsantéView / Mac 2.0, Out-of-Band	\$899
1012 & AsantéView / Mac 2.0, 1B/OOB, SNMP	\$1199
AsantéView / Mac 2.0 Software	\$249
SNMP H/W Module for Asanté Hub 1012	\$239
SNMP Card Agent for Mac (12-Pack)	\$119
AsantéView software only / Mac 2.0	\$239

BRIDGING

10BaseT Media Attachment Unit	\$79
AsantéPrint, Thick/Thin	\$329
AsantéPrint, Thick/10BaseT	\$329

TOKEN RING PRODUCTS

4/16 Mbps Token Ring Card, Mac II	\$479
4/16 Mbps Token Ring Card, Mac ILSI	\$359
4/16 Mbps Token Ring Card, Mac LCS	\$359
4 Mbps Token Ring Card, Mac SE	\$359

Warranties...

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- All other items carry manufacturer's warranty.

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- All products manufactured by ClubMac carry a 30 day money back guarantee.
- ClubMac extends all other manufacturers' return policies to its customers.
- Non-ClubMac products carry 30 day money back guarantee when specified.

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- Call for RMA number!
- Any product that is returned WITHOUT an RMA number will be refused.

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Tech Support (714)768-1490
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FIVE Year Warranty

CIRCLE 46 ON READER SERVICE CARD

1-800-258-2622

1-800-CLUBMAC

1-800-258-2622

Maya 2.0
Computer

800-998-0094

Power Tools!

\$3 Overnight Delivery

Internal Drives

Quantum 2-year warranty

10142...105 MB Pro Drive	299
10131...240 MB Pro Drive	549
10130...525 MB Pro Drive	1039
10148...80 MB Go Drive for PB	339

Connor 1-year warranty

10358...84 MB Drive	225
10357...120 MB Drive	335
9266...209 MB Drive	439

All internal hard drives come with Hard Disk Toolkit software.
Bracket w/cable10
Bracket w/cable/Quadra...20 (specify computer)

HammerDisk 130
128 megabyte
Magneto-optical drive
\$1569 #7319
30 day MBG

SyQuest Cartridges
44 MB \$61.50 ea.
When you buy a 10 pack of 44 MB cartridges for \$615

5912...44 MB Cartridge (1)	65
9728...44 MB Cartridges (10)	615
3603...88 MB Cartridge (1)	99
3600...88 MB Cartridges (10)	950

Hayes

8186...Optima 144 - 14,400/V.42/V.42bis	439
5970...Optima 96 - 9600/V.32/V.42/V.42bis	389
5971...Optima 24 - 2400/V.42bis/V.42	145
5024...Ultra 144 - 14,400/V.32/V.42bis	669
7391...Ultra 9600 - 9600/V.42/V.42bis	599
7440...Ultra 24 - 2400/V.42/V.42bis	399

Ultra 96 Bundle
The Ultra 96 is a networkable modem with V.32, V.42, V.42bis, MNP5 and comes with Smartcom II and Hayes Connect software.

Part # 1610

\$649

Accelerators

Applied Engineering 30 day MBG

4850...FastMath for Classic II	
16 MHz w/ 68882 FPU	109
2464...QuickSilver - 32K cache card/w/ FPU accelerator for lsi (allows use of SE/30 expansion cards)	199
4903...TransWarp LC 40 - 40 MHz for LC, w/ 32K static RAM cache 68882 FPU	995
7322...TransWarp CI 50 - 68030, 50 MHz, 68882 FPU, 64K static RAM for lsi	1395

DayStar 30 day MBG

10360...33 MHzTurbo 68040	1799
1667...Univ. PowerCache 40 - 68030, 40 MHz, 68882 FPU, 32K static RAM cache	749
1734...Univ. PowerCache 50 - 50 MHz	999
1613...FastCache 040 - 128K super-fast static RAM for Quadra	277
3584...Dualport lsi - 2 PDS slots, 20 MHz 68882 FPU	165
5561...Equalizer LC - 68030, 16 MHz, optional FPU, virtual memory compatible	185

Radius

10314...Radius Rocket 25i MHz - 25 MHz, 68040 for NuBus, 8 SIMM Slots	1299
2949...Radius Rocket 25 MHz - 25 MHz, 68040 for NuBus, FPU, 8 SIMM slots	1679
7870...Radius Rocket 33 MHz - 68040, 33MHz, FPU, 8 SIMM slots	2199

Input Devices

Kensington 30 day MBG

2547...Turbo Mouse 4.0	105
Microtek Scanners 30 day MBG	
5438...ScanMaker II Mac	899
5441...ScanMaker IIX	1249
Wacom	
9110...Wacom 6 x 9 Digitizing Tablet	499

Zoom Telephonics 30 day MBG

1168...AMX 2400 baud - V.22bis, V.22	63
7757...FaxModem AFX - 2400 data/9600send/4800 receive, MNP 2-4-5, V.42, V.42bis	84
3576...FX9624V - 2400 data/9600 S/R fax V.42, V.42bis, MNP 2-5	127
4698...VXV.32bis 14,400 modem - V.32bis, up to 57,600, V.42bis, V.42, MNP 2-5	227
3553...VXF V.32bis - 14,400 data & S/R fax, V.42bis, MNP-5, V.42, MNP 2-4, up to 57,600 bps	267

Zoom Fax Modem VFX

Zoom #3553

\$267

VFX V.32bis

14,400 baud Data & S/R fax with Software and Cable

7 YEAR WARRANTY

LIFETIME WARRANTY

Practical Peripherals
\$419

14400FX V.32bis
14,400 data 9600 S/R fax, V.32bis, V.42, V.42bis, QuickLink II, MNP 4-5, Lifetime warranty, #8063 30 day MBG

Modems

Dove 30 day MBG

6758...DoveFax Desktop 2400 data/9600 fax	199
5554...DoveFax LAN 10 User - 2400 data/9600 networkable fax	399
4109...DoveFax LAN NuBus 5 User - 2400 data/9600 networkable fax	365
5539...DoveFax LAN NuBus 10 User - 2400 data/9600 networkable fax	429
4796...DoveFax LE - 2400 data/9600 send/4800 receive fax	135
9634...DoveFax Plus - 2400 data/9600 send/receive fax & voice	265
4111...DoveFax Plus for NuBus - 2400 data/9600 fax & voice w/ software	299

Logicode Technology

5523...Quicktel Xeba M1414XV - 14,400 data 14,400 S/R fax V.32, V.32bis, V.42, V.42bis, MNP 4.5 w/ QuickLink & STF software	299
5525...Quicktel Xeba M9624XV - 2400 data 9600 S/R fax w/ QuickLink II & STF software, V.42, V.42bis, MNP 2-5	149

Practical Peripherals 30 day MBG

5434...2400 data/9600 S/R fax	119
8994...2400, V.42, V.42bis, MNP4-5	125
3089...2400 w/ Smartcom lifetime warr.	139
9849...9600 w/Smartcom lifetime warr.	349
8063...14400FX - 14,400 data/9600 S/R fax V.32bis, V.42, V.42bis, MNP 4.5	419

PSI Integration 30 day MBG

3143...COMstation One - 2400 data 9600 S/R fax	142
3142...COMstation Two - 2400 data 9600 S/R fax, V.42, V.42bis	247
5340...COMstation Four - 2400 data/9600 fax V.32, V.32bis, V.42, V.42bis, networkable	369
6965...COMstation Five - 14,400 data/14,400 S/R fax, V.32bis, V.42, V.42bis, MNP 2-5 up to 57,600 bps	439

Shiva 30 day MBG

3443...NetModem 2400 - networkable	339
6917...NetModem V.32 9600 - networkable, V.22, V.22bis, V.32	1039
2004...NetModem/Ethernet - 14,400, networkable, V.32, V.32bis, V.42, V.42bis	1475

Twincom

10335...24/96 Commuter - 2400 data/9600 send/4800 receive fax, V.29, V.27, V.22	122
10332...14.4 Pro - 14,400 data, S/R/fax	329
10334...14.4 PowerTwin internal - 14,400 data, S/R fax, V.32bis, V.32, V.42bis, V.42 for PB	299
10337...14.4 Voyager 14.4/96 S/R - 14,400 data, 9600 S/R fax, V.32bis, V.32, V.42bis, V.42, MNP 2-4.5	362
10333...24/96 PowerTwin internal - 2400 data 9600 Send/4800 receive fax for PB	125

Color For Your PowerBook

NoteBook Display Adapter 030

internal **\$469** #1848



PowerBook Gear

Applied Engineering 30 day MBG

8800...PowerBook Charger	135
8799...Auto Adapter	67

Asanté

2555...10Base-T - PowerBook SCSI	279
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BTI 30 day MBG

7562...PowerBook Battery	62
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Connectix 30 day MBG

8441...CPU PowerBook Utilities	49
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Dayna Communications 30 day MBG

5396...DaynaPort SCSI/Link (thin)	299
5414...SCSI/Link-3 (thick, thin, 10Base-T)	325

Envisio

1848...PowerBook Display Adapter	469
2411...ColorBook 16 (2 MB)	799

FWB

5567...80 MB PowerBook Int. Drive	719
5568...120 MB PowerBook Int. Drive	799

I/O Design 30 day MBG

8122...Slimline PowerBook Case	59
8112...PowerBook External Drive Case	65

Kensington 30 day MBG

1092...Deluxe PowerBook case	79
5976...PowerBook Keypad	95

Nisus

1612...Nisus Compact	92
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Symantec 30 day MBG

1199...Norton Utilities PB	67
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Sophisticated Circuits 30 day MBG

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ETC DataDrive 340M	649	719
ETC DataDrive 1200M	1549	1645

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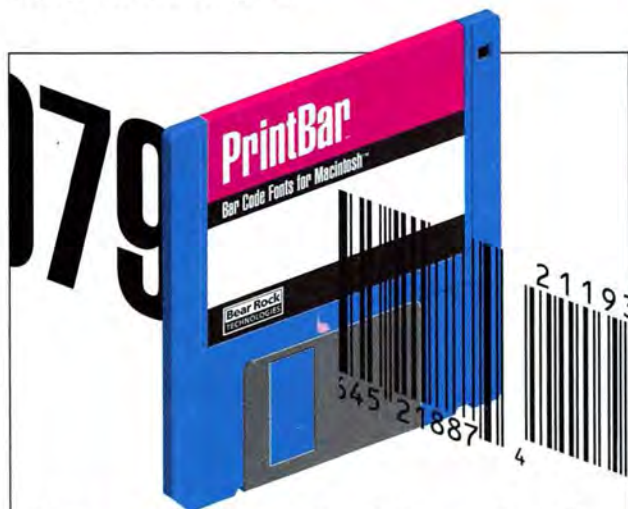
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Source: MacUser 1992 Study of Microcomputer Product Ownership and Buying Plans

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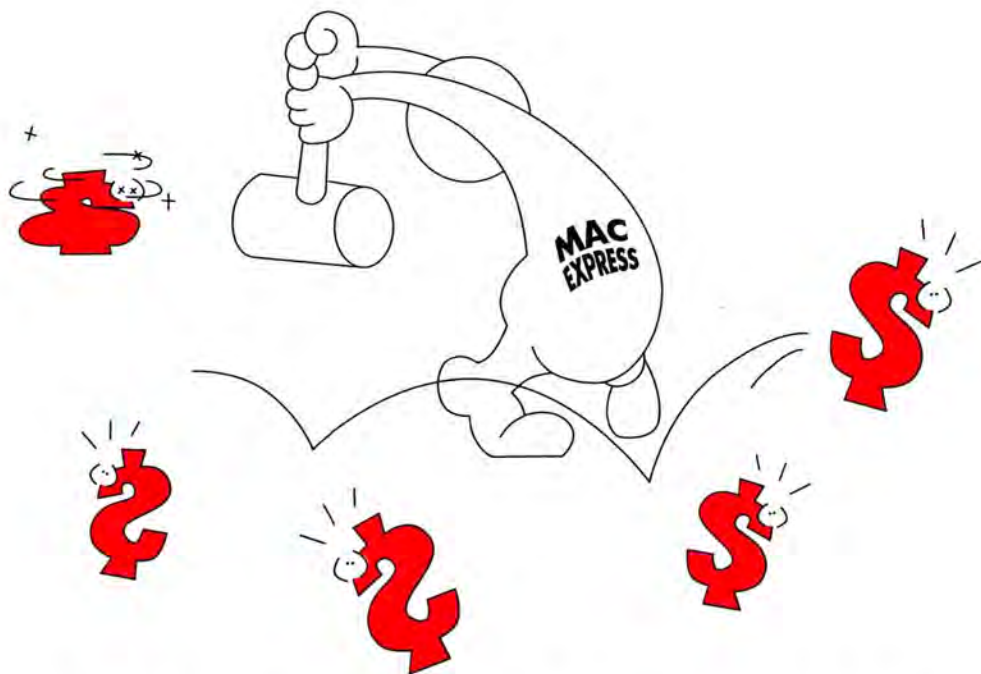
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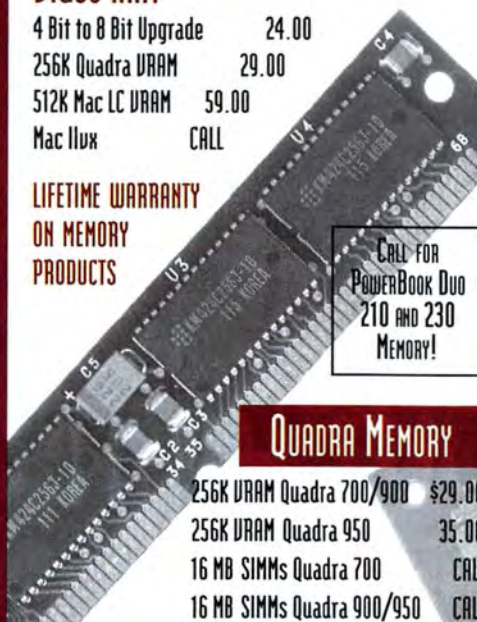
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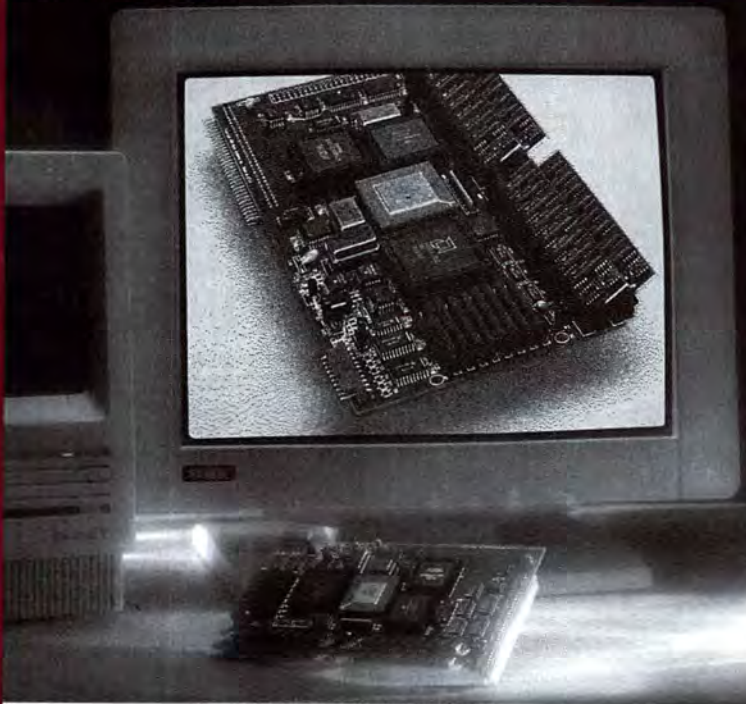


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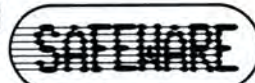
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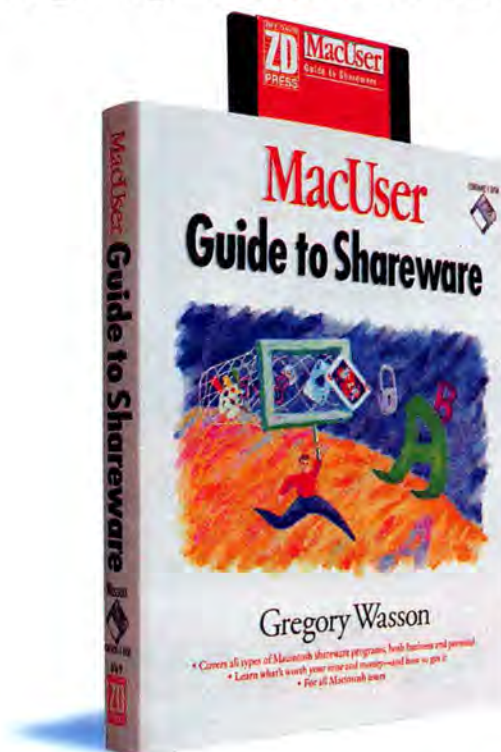
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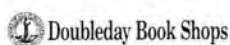
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Weird Signs



One look at Apple's latest products is enough to convince anyone: Something very strange is going on here.



It must have happened early last year. The information has been suppressed. This column probably will be the only chance you get to read the true story.

First of all, the Earth narrowly escaped annihilation as a Neptune-sized meteor barely missed it. A group of skinny aliens landed in Northern California and set up a huge dish that sent out a pulse to save the planet. Then they left without saying much. It was in all the papers until a few weeks ago, when history changed.

I can recall the event because I was in Texas at the time, standing within the 50-mile magnetic ring being built for the superconducting supercollider. Only a few people (all of whom were in central Texas within the magic ring) seem to be able to recall this event as well as many other events of the past few years. The Broncos beating the Falcons in the Super Bowl is the most notable change besides the meteor.

I've taken it upon myself to prove that the human time line has been tampered with. I'll do it by laying bare some screwball anomalies that prove that all human civilization has obviously been altered by aliens.

Two theories could account for why the aliens have concocted these wacky fake events. Theory 1 says that these screwball events are so-called corrections aliens make in order to readjust the event time line and cover up the fact that they ever visited our planet. Theory 2 is that even the meteor scare was bogus and that aliens are simply creating wacky unbelievable situations to stupefy and confuse us all in an attempt to drive everyone insane. Once we're insane, we will be herded like cattle and eaten or used for fertilizer or who knows what.

Anyway, the only way I can think of to prove that what I say is true is to simply list some of the weird events. Try telling me (or yourself!) that any of it makes sense.

1. Apple releases a series of computers called the Performas, which are actually inexpensive and as powerful as its mainstream systems. I mean, come on. Who believes this is happening?

2. Shortly after a price war breaks out in the computer business, IBM releases a bunch of cheap machines. Why would it do this?

3. Digital Equipment Corp. goes into the PC mail-order business and makes money at it! Digital and mail order? Let's face it — this isn't happening.

4. Apple CEO John Sculley, after becoming a multimillionaire under 12 years of Republican presidents and seeing his company grow to more than \$7 billion in sales by selling a narrow line of computers, switches to endorsing the Democratic candidate for president — a guy from a state known only for chicken farming.

5. The guy from the chicken-farming state wins the election! He beats an incumbent president? Oh sure, and cows can fly.


6. Digital jumps into bed with Microsoft and produces a world-class microprocessor called the Alpha chip but waits to put it into a computer until Microsoft releases an operating system for it. The chip languishes. The operating system is called Windows NT. Before it's even released, Microsoft names it Windows NT 3.1!! What happened to NTs 1, 2 and 3? Does this make any sense?

7. Apple's software division, Claris, decides to start selling PC software. Oh, right. That'll be the day.

8. Intel invents a new chip as part of the 80x86 family, following the 80286, 80386, and 80486. Instead of calling it the 80586, Intel gives it the ludicrous name Pentium. As if any reasonable company would do such a thing. Really unlikely, isn't it?

9. Apple and Novell start talking about a merger! Sure, there's two companies with compatible corporate cultures.

It got even weirder when I saw some new laptop from Apple that acted like a huge insertable disk and fit right into the front of the computer. This thing was not only weird but it also *looked* like it had been designed by aliens. Here's the joke: It actually worked! To make things even more ludicrous, it had a spectacular easy-to-read screen and the notebook weighed only four pounds! Ha ha ha ha. I had to laugh at this ridiculous situation. Even funnier was that it's probably the best-looking notebook made. Oh, right. This coming from a company that always thought laptops were a stupid idea.

Just look over these events, and tell me things aren't screwy and unbelievable. Then again, if the aliens have their way, you'll think this is just a lame attempt at humor and you'll laugh it off. What will convince you? How about Apple and IBM working together on a joint project or something like that? Nawwww. Too risky. Even the aliens know nobody would believe something like that could ever happen. 

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Both monitors are compatible with the Mac® II family, Quadra™ series, LC's, PowerBooks™ and PC systems. So you can use just one monitor for both types of platforms. *MacUser* noted the "powerful and versatile controls make switching from a Mac to a PC a snap."

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There are lots of reasons for considering an NEC MultiSync monitor for your Mac—the sharp, bright images, the vibrant colors, the large display area, the flexibility, the compatibility—to name five. And the 🐭🐭🐭🐭 to name five more.

For more information on our award-winning monitors, call 1-800-NEC-INFO (in Canada: 1-800-343-4418). Or for a complete brochure via fax, call NEC FastFacts™ at 1-800-366-0476, request #62234.

*For Macintosh 640 x 480 resolution, just attach NEC's FG/Mac cable adapter and plug into: Macintosh IIfx, IIfx, LC, LCII, IIfx, IIfx, Quadra™ 700, Quadra 900, Quadra 950, Performa™ 400, Performa 600, PowerBook™ 160, PowerBook 180, and the PowerBook 210 and PowerBook 230 with either the DuoDock™ or MiniDock™. Or with an add-in video card: Macintosh II, IIfx, IIfx, PowerBook 140, PowerBook 145, and PowerBook 170. Get the 640 x 480 FG/Mac adapter free by calling NEC at (312) 622-7427 8:30AM-5PM CST.

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*—MacUser Magazine
Aug. '92*



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